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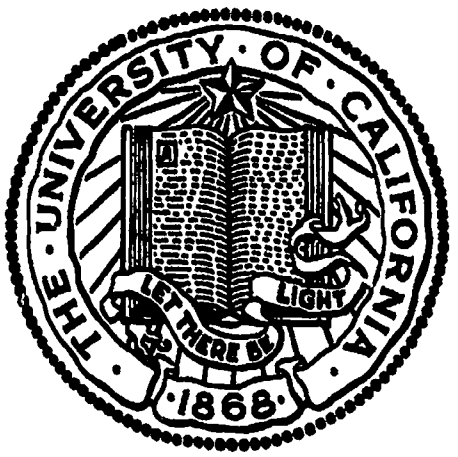
ABSTRACT

This study's objectives were to explore and analyze task interrelationships among department personnel; determine what specific tasks are currently performed in inhalation therapy/respiratory care departments; propose a series of appropriate tasks for occupational titles; and report future plans of the AHPP in the area of study. Contents include the study procedures, a sample survey, data analysis, results, conclusions, and implications. Fifty pages of appendixes include the health care facilities surveyed, tasks involved in maintenance functions, a respiratory care survey and task list, background information, percentage of respondents, and mean scores for administrative and supervisory tasks. Major findings and implications were: (1) there is no major quantitative differentiation between job title and the set of tasks an individual may perform; (2) no evidence of a career ladder was observed within the occupational field; (3) most daily activities of inhalation therapy/respiratory care personnel center on therapeutic tasks; (4) a specific set of tasks is proposed for each group of employees identified in the survey; and (5) education and training programs should be structured so each higher level incorporates all preceding levels. (NH)

THE UCLA ALLIED HEALTH PROFESSIONS PROJECT

Occupational Analysis
RESPIRATORY CARE/INHALATION THERAPY



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RESPIRATORY CARE/INHALATION THERAPY OCCUPATIONS

TASK ANALYSIS DATA

Training for the Inhalation Therapist
(OE 07.0903; DOT 079.368-018)

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Research and Demonstration Grant 8-0627
U. S. Office of Education, Bureau of Research
Department of Health, Education and Welfare

UNIVERSITY OF CALIFORNIA, LOS ANGELES
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FOREWORD

The Division of Vocational Education, University of California, is an administrative unit of the University which is concerned with the responsibilities for research, teacher education, and public service in the broad area of vocational and technical education. During 1968 the Division entered into an agreement with the U. S. Office of Education to prepare curricula and instructional materials for a variety of allied health occupations. For the most part, such materials are related to pre-service and in-service instruction programs ranging from on-the-job training through the Associate degree level.

A National Advisory Committee, drawn from government, education, professional associations in the health care field, and the lay public, provides guidance and help to the over-all activities of the Allied Health Professions Project. The following individuals and institutions participate in the activities of this nationwide interdisciplinary body.

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In addition, each of the specialized programs comprising the Projects has the benefit of consultation with a National Technical Advisory Committee of persons especially knowledgeable in the area concerned.

The support and interest of the National Advisory Committee contributed importantly to the continuing success of the Allied Health Professions Project.

Melvin L. Barlow, Director
Division of Vocational Education
University of California

Professor of Education, UCLA

Principal Investigator
Allied Health Professions Project

September 1971

P R E F A C E

The Allied Health Professions Project was initiated in August, 1968, by the Division of Vocational Education of the University of California, Los Angeles, for the purpose of developing curricula and instructional materials for use in health care related educational programs. This work is supported by Research and Demonstration Grant 8-0627 from the U. S. Office of Education, Department of Health, Education, and Welfare.

In the past twenty years the United States has experienced a very large increase in demand for health services of all kinds. As a result, there is a shortage of skilled personnel in the field which can best be resolved through increased educational efforts. A good educational program requires effective curriculum and instructional materials, hence the effort to direct funds and energy to the development of such materials as rapidly as possible.

Inhalation Therapy/Respiratory Care was selected as one of the allied health professions to be studied because of the increasing demand for qualified therapists, technicians, and other supportive personnel.

It is customary in developing curricula and instructional materials for use in an occupational education program to depend upon experts from the occupation for recommendations as to technical content and qualified consultants, and for help in validating the materials produced. To accomplish this end, the professional organizations of the Inhalation Therapy occupation, the American Association for Inhalation Therapy, American Registry for Inhalation Therapists and Cardiopulmonary Technologists, Inc., and the Joint Review Committee for Inhalation Therapy Education, were requested to designate representatives to assist the project. In addition, several practitioners, educators, and employers were selected to be members of the NTAC (National Technical Advisory Committee) for Inhalation Therapy/Respiratory Care.

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The Allied Health Professions Project wishes to acknowledge the advice, assistance, and guidance of the NTAC members.

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SUMMARY

OBJECTIVES:

1. To summarize the Allied Health Professions Project activities relating to Inhalation Therapy/Respiratory Care and to explore and analyze interrelationships, in terms of tasks performed among the department personnel.

2. To determine what specific tasks are currently being performed in Inhalation Therapy/Respiratory Care departments.

3. To propose a set or series of tasks appropriate for the occupational titles identified.

4. To report the future plans of the Allied Health Professions Project in the field of Inhalation Therapy/Respiratory Care.

PROCEDURE:

1. Establishment of an NTAC representing practitioners, supervisors, educators, and employers of Inhalation Therapy/Respiratory Care personnel.

2. Review of existing education and training programs in the field.

3. Collection and analysis of data (survey questionnaire) relevant to the activities of personnel who are employed in Inhalation Therapy/Respiratory Care hospital departments.

FINDINGS AND IMPLICATIONS:

1. There is no major differentiation (quantitatively) between job title and the set of tasks which an individual may perform.

2. At the present time, no evidence of a career ladder within the occupational field was observed.

3. Most of the daily activities of personnel employed in Inhalation Therapy/Respiratory Care departments center around "Therapeutic Tasks."

4. A specific set of tasks is proposed for each group of employees identified in the survey.

5. Education and/or training programs should be structured such that each higher level incorporates all preceding levels.

I. INTRODUCTION

Early in 1968, the Division of Vocational Education of the University of California at Los Angeles was funded by the United States Office of Education to establish a research and demonstration project. The Allied Health Professions Project (AHPP) was initiated for the development of curricula and instructional materials to be used in pre-service and in-service training through the Associate degree level. The objectives of the project were: (1) to develop curricula and instructional materials for more than 20 different allied health occupations; (2) to develop innovative instructional programs for pre-service and in-service training in the selected occupations; (3) to establish a curricula information center for allied health professions; and (4) to provide an ongoing evaluation and upgrading of the programs that were developed.

Rapidly emerging as an occupational area in the allied health professions, the field of Inhalation Therapy/Respiratory Care has already developed substantially with respect to the growing number of hospital departments and the increasing ranks of personnel employed in these departments. Since the establishment of this occupational field ten years ago, a number of professional societies and associations have been organized, and these groups have been responsible for setting standards of performance.

These standards are now being reevaluated and redirected toward improving the quality of Respiratory Care. An essential first step is to determine the current state of the art in terms of the people who are performing specific operational tasks.

In order to create useful and relevant instructional materials, it was judged necessary to identify those items which should be included within the educational program.

II. PROCEDURES

The first step was the development of a task inventory for each occupation. This list was to include all possible tasks being performed by anyone in the job category. It was believed that the task inventory would assist in defining performance goals and in pointing up the specific skills which must be learned to do the job. Guidance would thus be provided for the development of educational materials based on the tasks or skills required to perform the job satisfactorily.

Such a detailed inventory was desired for the field of Respiratory Care and Inhalation Therapy, to include all tasks which might be performed in those areas. This listing was developed in the following manner: (1) a nationwide survey of job descriptions was undertaken; (2) a review of curricula and current education programs was initiated; (3) pertinent literature was reviewed; (4) local laboratory facilities were visited; (5) interviews were conducted with local respiratory care therapists and technicians; and (6) experts were consulted in the field of respiratory therapy.

A National Technical Advisory Committee (NTAC) was selected to guide the work of the project. (See preface for roster of members.) The first meetings were held on April 9 and 10, 1970, at AHPP headquarters in Los Angeles, for the purpose of reviewing the task inventory and discussing the development of curricula and instructional materials for technician training programs.* The task list, compiled by the project staff, was reviewed and revised by the Committee.

* Freeland, Thomas (Mary Ellison, ed.), Meeting Report, National Technical Advisory Committee for Respiratory Care, Allied Health Professions Project (Los Angeles, California, 1970).

III. SURVEY SAMPLE

The AHPP survey sites consisted of medical facilities located in six geographical areas, each of which was a metropolitan center and extended approximately 200 miles in radius to include urban and rural hospitals. The metropolitan centers chosen for the survey were Boston, Chicago, Birmingham, Denver, Los Angeles, and Seattle. Other criteria for selection included size (number of beds), and type (acute, voluntary, proprietary, or extended-care facility). Each geographical area included two hospitals with more than 200 beds, two hospitals which ranged in size from 100 to 199 beds, two hospitals of fewer than 100 beds, and two extended-care facilities. Further criteria for selection of institutions were accreditation by the Joint Commission of Accreditation, meeting the requirements of Medicare, and willingness to participate in the survey. The total AHPP sample consisted of 48 facilities (see Appendix I).

In addition to the AHPP panel of hospitals, a second group of health care facilities selected by NTAC members was included. These institutions were each thought to have an exceptional Respiratory Care or Inhalation Therapy department (see Appendix II).

The procedure developed by the AHPP required the design of a self-administered survey questionnaire. In order to control distribution of the survey, a specific hospital employee was chosen as the liaison between the project and each of the survey hospitals. The project staff and consultants designed the survey format, which consisted of a series of questions relating to the performance of each task listed in the inventory. The following questions were asked: (1) Do you do this task? (2) Do you supervise this task? (3) How often do you do this task? (4) How difficult is this task to perform?

A series of questions relating to cleaning, sterilization, maintenance, and repair of equipment was included for appropriate task items. (Results are reported in Appendix III.) A sample of the survey instrument, along with the instructions for completing the form, appears in Appendix IV.

The questionnaire was then submitted to the NTAC for their comments and corrections.

Tasks which had been arbitrarily categorized (Appendix V) were placed randomly on the questionnaire form. To ascertain whether respondent fatigue occurred, the pages of the questionnaire were systematically rotated. In the opinion of the investigators, the randomization of tasks would break mental set, and insure that each task would be evaluated on its own merits. At the end of each questionnaire a blank sheet was enclosed so that respondents could add any task they perform which was not listed in the questionnaire.

The questionnaires were sent to the previously selected individual (in the case of the AHPP sample) or Respiratory Care department (in the case of the supplementary sample) for distribution. Those completing the questionnaire were asked to return it directly to the University and were supplied with

a stamped self-addressed envelope. A total of 331 questionnaires were distributed to individuals employed in the Respiratory Care or Inhalation Therapy department in the two samples; 176 (53%) were returned prior to the cutoff date. Table 1 summarizes the respondents' position titles. (See Section IV for group definitions.)

TABLE 1

Position Titles of All Survey Respondents

	Admin./ Supv.	Nurse	Ther- apist	Tech- nician	Orderlies	Other	N.A.*	Total
AHPP	18	1	10	19	8	6	5	67
Supple- mental	20	4	26	39	10	8	2	109
	38	5	36	58	18	14	7	176

*No Answer

Tables 2 and 3 on the following pages illustrate the response rate for geographical region and hospital size for each of the sub-populations.

TABLE 2

Response Rate, Geographical Region and Hospital Size
(AHPP Sample)

Region	Hospital Size					Percent Total
	200 or more	100-199	100 or less	ECF	TOTAL	
Birmingham	15/8*	4/3	2/0	0/-	21/11	52
Boston	19/18	7/4	3/2	0/-	29/24	83
Chicago	25/3	6/6	3/2	0/-	34/11	32
Denver	8/0	8/7	0/-	0/-	18/7	44
Los Angeles	9/4	0/-	0/-	0/-	9/4	44
Seattle	18/4	6/5	7/0	0/-	31/9	29
Total Returned	37	25	4	0	66+1**=67	49

*Number of questionnaires distributed/number of questionnaires returned.
**Geographical area could not be determined for one respondent.

TABLE 3

Response Rate, Geographical Region and Hospital Size
(Supplementary Sample)

Region (Federal Census)	Distributed/ Returned	Total Percentage
1. New England	39/19+	54
2. Middle Atlantic	10/0	0
3. South Atlantic	39/31	79
4. East North Central	24/13	54
5. West North Central	33/19	58
6. Mountain	36/10	28
7. Pacific	14/10	71
Total	102 + 77 ++= 179	59

*Number of questionnaires distributed/number of questionnaires returned.
+All hospitals were 200 beds or over.
++Geographical region could not be determined for seven respondents.

IV. DATA ANALYSIS

Analysis of Background

Background information from the survey respondents was analyzed by position titles which were reported as follows:

1. Department Administrator/Department Supervisor/ Department Head
2. Chief Therapist
3. Inhalation Therapy Supervisor
4. Inhalation Therapy Assistant Supervisor
5. Inhalation Therapist
6. Inhalation Therapist I, III
7. Inhalation Therapy Technician
8. Respiratory Care Technician
9. Pulmonary Technician
10. Nurse - Respiratory Care/Inhalation Therapy
11. Inhalation Therapy Assistant/Aide/Orderly
12. Laboratory Assistant/Aide/Orderly
13. Other occupational titles

In order to tabulate the data on larger groups within the sample, reported position titles were combined as follows:

1. Department Administrator Supervisor/Head, Chief Therapist, Inhalation Therapy Supervisor, Inhalation Therapy Assistant
2. Inhalation Therapist, Inhalation Therapist I, III
3. Inhalation Therapy Technician, Respiratory Care Technician, Pulmonary Technician
4. Inhalation Therapy Assistant/Aide/Orderly, Laboratory Assistant/Aide/Orderly
5. Nurse (Primarily responsible for Respiratory Care or Inhalation Therapy procedures)

6. Other occupational titles

7. Respondents who did not indicate their position title

Of the seven groups of position titles listed above, the first three groups accounted for 75 percent of the respondents. Data obtained from the background information portion of the questionnaire did not indicate any trend which would be related to curriculum development. A review of selected characteristics pertaining to the background information of the survey population can be found in Appendix VI.

V. ANALYSIS OF QUESTIONNAIRE INFORMATION

The processing and reduction of both the survey data and background data were provided by the Survey Research Center of the University of California at Los Angeles. Frequency distributions were obtained for frequency of task performance, difficulty of task performance, and supervisory requirements. Frequency distributions were also obtained for those tasks which included equipment handling. This information is reported for each occupational group previously specified, with the exception of nurses.

The mean (arithmetical average) and the mode (the score most frequently indicated) were calculated for each of the aforementioned factors for each occupational subgroup. In the primary analysis of the data, the mode was used in preference to the mean because it was found that the shape of the distribution was such that the mean in many cases was not representative of any of the respondents. (Appendix VII shows the percentage of respondents and the mean response for each group.) Wherever there was a bimodal distribution, the upper modal value is indicated. (Selection was necessary for only 8 of the 144 tasks.)

The replies of respondents who indicated that they either performed or supervised a specific task were combined. This decision was based on the rationale that familiarity with the task was as essential for supervision of the task as for performance of the task.

The results of the questionnaire analysis are described in terms of the following task parameters:

1. Percentage of respondents who either perform or supervise the task. The percentage of respondents who reported performing or supervising a specific task is shown by the following symbols:

   a. 0 indicates that no one in the occupational subgroup performs this task.

   b. + indicates that from 1 percent to 24 percent of respondents in a subgroup report performing the task.

   c. An underlined mode value, e.g., 1, indicates that from 25 to 74 percent of the respondents in a subgroup report performing the task; the mode frequency of performance is therefore shown as category 1, several times a day.

   d. A mode value which is enclosed in a box, e.g., 2, indicates that 75 percent or more respondents in a subgroup reported performing the task, and the mode frequency of performance was category 2, "once a day or several times a week."

2. Modal frequency of respondents who perform or supervise the tasks for each of the listed subgroups.

   a. Administrators/Supervisors

b. Therapists

c. Technicians

d. Aides/Orderlies

e. Other miscellaneous position titles which were not classified.*

3. A combined score, representing mode difficulty, is reported where more than 24 percent of a subgroup indicated performance.

Task List Exclusions and Additions

Of the 144 tasks listed on the survey, only one, Radioactive gas techniques (ventilation/perfusion), was not performed by any of the survey respondents. A listing of additions which could not be incorporated into existing questionnaire items is shown in Appendix VIII.

Distribution of Tasks by Occupational Category

The total list of tasks was analyzed by way of a Task Performance Similarity Indexing Program (developed by Dr. Thomas Cullen, AHPP) to ascertain if clusters of specific tasks could be assigned to specific job titles. It was found that this survey population constituted a homogeneous group with very little differentiation in terms of specific tasks performed and the respondents' stated position title. In other words, respondents of all position titles or categories reported performing similar tasks.

*Data from respondents who indicated that they were nurses (n=5) or failed to indicate a position title (n=7) were not reported in the results.

VI. RESULTS

For convenience, the task list was divided into five sections: Administrative and Supervisory Tasks or Activities; Education-Training-Research Tasks; Diagnostic Techniques; Therapeutic Techniques; and Clerical and Miscellaneous Tasks. The tasks were listed on the questionnaire in a random sequence and the first ten pages of the questionnaire were systematically rotated. This was done to eliminate "mental set" and to equalize respondent fatigue for each page of the questionnaire. The data are reported in the aforementioned categories.

Tables 4 through 9 depict percent of performance, frequency of task performance, and difficulty of task performance as reported by survey respondents for each of the defined groups (see Section IV).

TABLE 4

ADMINISTRATIVE AND SUPERVISORY TASKS

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mean Difficulty
1.1	Supervise departmental public relations and information service.	1*†	#	#	#	#	1†
1.2	Establish and maintain safety standards.	[1]	1	1	1	1	1
1.3	Establish and maintain standards of hygiene.	[1]	1	1	1	1	1
1.4	Establish an inventory system.	4	#	#	#	#	2
1.5	Perform inventory of supplies and equipment.	[3]	4	3	2	3	1
1.6	Plan departmental work flow.	[1]	#	#	#	1	2
1.7	Plan space requirements.	4	#	#	0	#	3
1.8	Coordinate work schedules with other departments.	2	1	#	#	#	1
1.9	Draft departmental budget estimates.	4	#	#	0	#	2
1.10	Draft job descriptions.	4	#	#	0	#	2
1.11	Determine staff requirements.	4	#	#	#	#	2
1.12	Develop departmental evaluation procedures.	4	#	#	#	#	2
1.13	Develop departmental hiring procedures.	4	#	#	#	#	2
1.14	Interview prospective employees and recommend action.	4	#	#	0	0	2
1.15	Develop departmental procedure manual.	4	4	#	#	4	2
1.16	Develop departmental policy manual.	4	#	#	0	#	2
1.17	Evaluate equipment performance.	[1]	1	1	#	1	2

Key: *Percentage of respondents performing

a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. [ ] = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)

1 = several times a day
2 = once a day--several times per week
3 = once a week--several times month
4 = once a month or less

Difficulty (‡)

1 = easy
2 = moderately difficult
3 = difficult

TABLE 4 (Continued)

ADMINISTRATIVE AND SUPERVISORY TASKS

Task Number	TASKS	Administrators/ supervisors	Therapists	Technicians	Aides/ orderlies	Other miscellaneous	Mean Difficulty
1.18	Initiate purchase orders.	■†	#	#	#	#	1†
1.19	Check equipment specifications.	1	1	2	#	1	2
1.20	Organize staff meetings.	4	#	#	0	0	1
1.21	Prepare statistical reports	4	#	#	#	1	1
1.22	Establish departmental charge system.	4	#	#	0	#	2
1.23	Attend relevant hospital management.	3	#	#	0	#	2

Key: *Percentage of respondents performing

a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. ■ = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (†)
1 = easy
2 = moderately difficult
3 = difficult

** = insufficient n

1. **Administrative and Supervisory Tasks**

The 23 tasks identified in this area are related to the operations and maintenance of a Respiratory Care Department.

Performance

All tasks listed in this category were performed by at least 25 percent of the subgroup Administrators/Supervisors; in addition, six of the 23 tasks were reported as being performed by more than 75 percent of the members of this subgroup. It was surprising that Task No. 1.5, "Perform inventory of supplies and equipment," was reportedly performed by more than 75 percent of the Administrators/Supervisors subgroup. One would expect this particular function to be performed by a lower-level employee; it is possible that the task may have been misinterpreted as supervising an inventory count. (See Appendix VII.)

None of the tasks in this functional area was performed by more than 75 percent of the respondents in any of the other subgroups.

With few exceptions, the tasks reported as being performed by members of the other subgroups appear to be consistent with the expectations of experts in the field. The report of performance of Task No. 1.2, "Establish and maintain safety standards" and Task No. 1.3, "Establish and maintain standards of hygiene," by Technicians and Aides/Orderlies may be explained by the inclusion of maintenance functions along with the establishment of safety and hygiene standards.

The findings of the occupational subgroup Other/Miscellaneous are reported; however, because individuals grouped in this category could not be identified, or occupational groups which were identified were composed of only one or two individuals, the results of these findings will not be discussed.

Frequency

With the exception of Task No. 1.17, "Evaluate equipment performance," and Task No. 1.19, "Check equipment specifications," the mode frequency of performance appeared to be a reasonable reflection of the task statement. A possible explanation for the high value reported for the aforementioned tasks may be the continuous equipment surveillance carried out by many Respiratory Care Departments. It is possible that these task statements were not interpreted as the evaluation or assessment of the performance characteristics of new or repaired equipment, but rather the continuous surveillance of equipment performance.

Difficulty

The reported mode difficulty is a combination of mode values for all subgroups for which the percentage of respondents performing the task was 25 or more.

Eight of the 23 tasks were reported as being "easy" to perform; 14 tasks were judged to be "moderate," and only one was judged to be "difficult." It should be noted that the task which was judged "difficult" was performed primarily by the Administrators/Supervisors subgroup.

Only two tasks (No. 1.17, "Evaluate equipment performance" and No. 1.19, "Check equipment specifications") were rated "moderate" by the Subgroup identified as Technicians.

Other tasks which were performed by either Technicians or Aides/ Orderlies were assessed as "easy."

TABLE 5

EDUCATION - TRAINING - RESEARCH TASKS

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Task Difficulty
2.1	Conduct or assist in research.	3*†	4	#	#	#	3₹
2.2	Teach inhalation therapy procedures.	1	1	2	#	1	2
	a. Patients (e.g., postural drainage)	1	1	2	#	1	2
	b. Department members	1	4	3	#	#	1
	c. Clinical students	1	2	3	#	#	1
	d. Nursing staff	3	2	3	#	4	2
	e. Medical staff	4	4	#	0	#	2
2.3	Teach safety techniques.	1	1	1	#	1	1
2.4	Participate in relevant community health projects.	4	#	#	0	#	2
2.5	Participate in "health career" promotion.	4	#	#	0	#	2
2.6	Orient new employees to hospital and departmental procedures.	4	4	4	4	#	1
2.7	Develop education and/or training programs.	4	4	#	#	#	3
	a. On-the-job training programs	4	#	#	0	#	2
	b. In-service training programs	4	#	#	0	#	2
	c. Inhalation therapy school programs	4	#	#	#	0	2
2.8	Design and implement home care programs.	4	#	#	#	0	2

Key: *Percentage of respondents performing

a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month

Difficulty (₹)
1 = easy
2 = moderately difficult

2. Education - Training - Research Tasks

Fourteen tasks or activities were enumerated in this category. The majority of these tasks relate to education and/or training functions which may be performed by members of a Respiratory Care Department; only one task in this category pertains to research activity.

Performance

All tasks in this category were performed by subgroups: Administrators/ Supervisors, Therapists, and Technicians. Aides/Orderlies reported that they performed ten of the 14 tasks. They do not perform Task No. 2.2e, "Teach inhalation therapy procedures to medical staff," Task No. 2.4, "Participate in relevant community health projects," Task No. 2.5, "Participate in health career promotion," or Task No. 2.7a, "Develop education and/or training programs for on-the-job training programs." These may be considered as discretionary tasks which are not entry-level in nature.

The percentage of the Administrators/Supervisors subgroup which perform tasks in this category was always equal to or better than 25 percent. Five tasks were performed by 75 percent or more of all respondents in this subgroup. The percentage of Therapists performing tasks in this category ranged from b to d (see Table 5). Only one, Task No. 2.2, "Teach inhalation therapy procedures," was reported as being performed by more than 75 percent of the Therapists subgroup. Five tasks in this category were reported as being performed by less than 24 percent of the Therapists subgroup.

The Technicians subgroup reported performing all tasks in this category; however, only seven of the 14 tasks are performed by more than the 25 percent but less than 75 percent of the respondents.

As might be expected, the subgroup identified as Aides/Orderlies reported performing the smallest number of tasks in this category. The percentage of the group responding was less than 24 for all tasks for which performance was indicated except Task No. 2.6, "Orient new employees to hospital and departmental procedures." In all probability, the Aides/Orderlies group is involved in orientation activities; however, these activities may be limited to a demonstration and/or description of the tasks which they themselves perform.

Frequency

With the exception of two tasks, the mode frequency of performance was very similar for all subgroups for which 25 percent or more of the respondents indicated performance of the task. Task No. 2.2b, "Teach inhalation therapy procedures to department members," and Task No. 2.2c, "Teach inhalation therapy to clinical students," were performed more frequently by Administrators/Supervisors. As one would expect, these tasks are done less frequently by Technicians and Therapists. The reported mode values ranged from 1 (several times a day) to 4 (once a month or less). The teaching functions were, predictably, reported performed more frequently than the development of new programs.

Difficulty

Four tasks had a reported mode difficulty of 1 (easy). They were Task No. 2.2b, "Teach inhalation therapy procedures to department members," Task No. 2.2c, "Teach inhalation therapy procedures to clinical students," Task No. 2.3, "Teach safety techniques," and Task No. 2.6, "Orient new employees to hospital and departmental procedures," all of which relate to teaching or training functions. Only one task was rated as 3 (difficult), "Develop education or training programs," the remaining seven tasks were reported to be moderately difficult to perform.

TABLE 6

DIAGNOSTIC TECHNIQUES

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mean Difficulty
3.1	Operate ECG recorder.	#	#	#	#	#	* **
3.2	Perform gas analysis.	1*†	#	2	#	#	1†
	a. Simple	2	#	#	#	#	1
	b. Multiple	#	#	#	#	#	*
	c. Blood gas tensions	1	#	#	#	#	2
3.3	Operate pressure transducers.	#	#	#	#	#	*
3.4	Administer and assist in exercise testing.	4	3	#	#	#	2
3.5	Measure blood pH.	2	#	#	#	1	2
3.6	Operate multi-channel recorder(s).	#	#	#	0	#	*
3.7	Operate telemetry system(s).	#	0	#	0	#	*
3.8	Assist with cardiac catheterization.	*	#	#	#	#	*
3.9	Perform calculations for pulmonary function tests.	2	#	#	#	1	2
3.10	Compare pulmonary function test results with norms.	2	#	#	#	1	1
3.11	Induce and collect sputum samples.	3	2	3	2	2	1
3.12	Collect tracheal-bronchial secretions.	2	1	3	#	3	1
3.13	Perform and assist with arterial punctures.	3	#	2	#	1	1
3.14	Measure vital signs.	1	1	1	#	#	1

Key: *Percentage of respondents performing
a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. □ = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (‡)
1 = easy
2 = moderately difficult
3 = difficult

** = insufficient n

TABLE 6 (Continued)

DIAGNOSTIC TECHNIQUES

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mode Difficulty
3.15	Evaluate vital signs.	2*†	1	3	1	3	2¥
3.16	Recognize artifacts in ECG records.	1	1	#	0	#	3
3.17	Identify wave forms of ECG.	4	2	#	0	#	3
3.18	Perform auscultation.	1	1	#	#	#	1
3.20	Perform pulmonary function tests.	2	1	#	#	3	1
	a. Functional residual capacity	2	#	#	#	#	1
	1. Nitrogen wash-out	#	#	0	#	0	* **
	2. Helium dilution	#	#	#	0	#	*
	3. Body box (Plethysmograph)	0	#	0	0	0	*
	b. Spirometry	2	4	2	#	#	1
	1. (Forced) vital capacity	2	3	2	#	#	1
	2. Slow vital capacity	2	4	#	#	3	1
	3. Bedside spirometry	3	4	3	#	0	2
	c. Maximum voluntary ventilation (MVC)	2	1	#	#	#	1
	d. Expired air collection and analysis	#	#	#	#	#	*
	e. Diffusion capacity	#	#	0	#	0	*
	f. Compliance measurements	#	#	#	0	#	*

Key: *Percentage of respondents performing

a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. [ ] = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (¥)
1 = easy
2 = moderately difficult
3 = difficult

TABLE 6 (Continued)

DIAGNOSTIC TECHNIQUES

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mean Difficulty
	g. Airway resistance measurements	#	#	#	0	0	*
	h. Measure alveolar p CO_2	#	#	#	#	#	*
	i. Estimate arterial p CO_2	#	#	#	#	#	* **
	j. Measure cardiac output	#	0	#	0	0	*
	1. Fick principle	#	0	#	0	#	*
	2. Indicator dilution technique	#	0	0	0	0	*
	3. Plethysmography	#	0	0	0	0	*
	k. Pneumotachometer	#	#	#	0	0	*
	l. Radioactive gas techniques (ventilation/perfusion)	0	0	0	0	0	*

Key: *Percentage of respondents performing

a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. ⌋ = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (₹)
1 = easy
2 = moderately difficult
3 = difficult

** = insufficient n

3. Diagnostic Techniques

Forty-three activities or tasks are listed in this functional category. With the exception of Task No. 3.4, "Administer and assist in exercise testing," all tasks in the category are related either to assisting with, or the direct collection and/or analysis of physiological data.

Performance

Task No. 3.11, "Induce and collect sputum samples," was reported as being performed by 75 percent or more of the subgroup Administrators/ Supervisors. Respondents in this subgroup also indicated that they do not perform either plethysmography or ventilation/perfusion studies using radioactive gas techniques. The latter, Task No. 3.20L, "Perform pulmonary function tasks, radioactive gas techniques (ventilation/perfusion)," was the only task on the entire list which was not reported as being performed by any of the survey respondents. The Administrators/Supervisors subgroup indicated less than 25 percent performance for 17 of the tasks in this functional area, many of which were categorized as pulmonary function tasks.

The subgroup identified as Therapists performed 37 of the 43 tasks. They do not perform Task No. 3.7, "Operate telemetry system(s)," Task No. 3.20j, "Perform pulmonary function tests (measure cardiac output)," Task No. 3.20j1, "Perform pulmonary function tests (measure cardiac output--Fick principle)," Task No. 3120j2, "Perform pulmonary function tests (measure cardiac output using indicator dilution technique)," Task No. 3.20j3, "Perform pulmonary function tests (measure cardiac output using plethysmography)," or Task No. 3.20L, "Radioactive gas techniques (ventilation/perfusion)."

For this same subgroup, only 14 tasks were reported as being performed by more than 25 percent of the respondents. Only one of the 16 (Task No. 3.11, "Induce and collect sputum samples") is reportedly performed by more than 75 percent of the respondents in this category.

Six of the tasks in this category were not performed by any of the respondents identified as Technicians. Of the remaining tasks, none is performed by more than 75 percent of the respondents in this group. Only nine tasks are reported as being performed by 25 to 75 percent of the respondents classified as Technicians.

Only two tasks were reported as being performed by 25 to 75 percent of Aides/Orderlies. These were No. 3.11, "Induce and collect sputum samples," and No. 3.15, "Measure vital signs." Fifteen of the tasks in this category were not performed by any of the respondents in the Aides/Orderlies group. The remainder of the tasks were performed by less than 24 percent of the respondents who composed this group.

Frequency

The most frequently performed task, both in terms of percentage of the respondents who reported doing the task and in mode frequency of

performance, was Task No. 31.4, "Measure vital signs." Each of the subgroups reported a mode frequency of 1 (several times a day).

For most of the remaining tasks, the mode frequency of performance was related to the position title; i.e., the Administrators/Supervisors subgroup had a higher mode frequency of performance than the other subgroups that reported performing the tasks.

Difficulty

Mode difficulty scores were reported for only 23 of the tasks. No indication of mode difficulty is shown if less than 24 percent of the respondents in each subgroup reported that they performed the task. Mode difficulty varied from 1 (easy) to 3 (difficult). Interestingly, Task No. 3.16, "Recognize artifacts in ECG record," and Task No. 3.17, "identify wave forms of ECG," were rated as the most difficult tasks in the diagnostic techniques category. (Undoubtedly this reflects a lack of knowledge on the part of the many technicians in relation to ECG technology.) Six of the tasks were judged to be moderately difficult and the rest were assessed as being easy.

TABLE 7

THERAPEUTIC TASKS

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mode Difficulty
4.1	Operate defibrillator.	4*+	#	#	#	#	2+
4.2	Operate respirators.	1	1	1	1	1	2
	a. Treatment (IPPB)	1	1	1	1	1	1
	b. Assisters	1	1	1	4	4	1
	c. Controllers	1	1	1	4	4	1
4.3	Aerosol generators.	1	1	1	2	2	1
	a. Vaporizers (steam)	1	1	1	4	4	1
	b. Bubbler type	1	1	1	1	1	1
	c. Jet type	1	1	1	1	1	1
4.4	Administer or assist with exercise conditioning.	2	#	#	#	#	2
4.5	Humidifiers.	1	1	1	1	1	1
	a. Nebulizer type	1	1	1	1	1	1
	b. Centrifuge type	1	1	#	1	1	1
	c. Ultrasonic type	1	1	1	1	1	1
4.6	O2 Administration.	1	1	1	1	1	1
	a. Nasal devices	1	1	1	1	1	1
	b. Masks	1	1	1	1	2	1

Key: *Percentage of respondents performing

a. 0 = No one in the occupational subgroup reported performing the task.

b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.

c. _ = From 25 to 74 percent of the subgroup indicated performing the task.

d. □ = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (+)

1 = several times a day

2 = once a day--several times per week

3 = once a week--several times a month

4 = once a month or less

Difficulty (+)

1 = easy

2 = moderately difficult

3 = difficult

* = insufficient n

TABLE 7 (Continued)

THERAPEUTIC TASKS

Task Number	TASKS	Administrators/ supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mean difficulty
	c. Tents	[4]†	[1]	2	1	2	1¥
	d. Incubators	4	1	3	1	3	1
4.7	Operate CO_2 rebreathers.	3	4	3	1	2	1
4.8	Perform closed chest cardiac massage (emergency care).	[1]	[1]	1	1	2	1
4.9	Perform artificial respiration.	[3]	[2]	[3]	4	2	1
4.10	Recognize expected reactions to treatment.	1	[1]	[1]	1	2	1
4.11	Recognize complications of/or adverse reactions to treatments.	1	[1]	[1]	3	1	2
4.12	Know the contraindictions of treatments.	[1]	[1]	[1]	1	1	2
4.13	Assist with or perform hyperbaric procedures.	#	#	#	0	0	1
4.14	Use suctioning equipment.	[2]	[1]	[1]	#	1	1
4.15	Assist with postural drainage.	[3]	[2]	[3]	#	2	1
4.16	Perform chest physiotherapy.	1	1	1	#	#	2
4.17	Perform intubations.	4	#	#	0	#	2
4.18	Give tracheostomy care.	[1]	1	1	#	#	1
4.19	Use portable (tank) O_2 in treatments.	[1]	[2]	[1]	1	1	1
4.20	Use piped O_2 in treatments.	[1]	[1]	[1]	1	1	1
4.21	Use mixed gases in treatments.	[4]	4	2	#	#	1

Key: *Percentage of respondents performing
a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. [ ] = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (¥)
1 = easy
2 = moderately difficult
3 = difficult

** = insufficient n

TABLE 7 (Continued)

THERAPEUTIC TASKS

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mode Difficulty
4.22	Use pharmacological aids as directed.	[1]*†	[1]	1	1	1	1Ψ
	a. Bronchodilators	[1]	[1]	[1]	1	1	1
	b. Detergents	[1]	[1]	1	1	1	1
	c. Mucolytics	[1]	[1]	[1]	1	1	1
	d. Proteolytic enzymes	4	4	4	#	3	1
	e. Antibiotics	[4]	4	4	#	4	1
	f. Steroids	4	4	3	*	*	1
	g. Antifoam agents	[2]	2	1	4	2	1
4.23	Apply sterile techniques.	2	1	1	1	1	1

Key: *Percentage of respondents performing

a. 0 = [illegible] in the occupational subgroup reported performing the task.

b. * = From 1 to 24 of the respondents in subgroup indicated performing the task.

c. # = From 25 to 74 percent of the subgroup indicated performing the task.

d. [1] = [illegible] in the occupational subgroup indicated performing the task.

Frequency (†)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (Ψ)
1 = easy
2 = moderately difficult
3 = difficult

** = insufficient n

4. Therapeutic Tasks

Forty-two activities or tasks comprise this category. Most of the daily activities of personnel in the Respiratory Care Unit are included.

Performance

Thirty-two of the tasks were reported as being performed by 25 to 74 percent of the respondents who identified themselves as Aides/Orderlies. This same group reported that they did not perform Task No. 4.13, "Assist with or perform hyperbaric procedures," or Task No. 4.17, "Perform intubations." Eight tasks were reported as being performed by 24 percent or less of the respondents in this category. No tasks were reported as being performed by more than 75 percent of the respondents in the subgroup Aides/Orderlies.

The Technician subgroup reported that 20 tasks in this category were performed by at least 25 percent to 74 percent of the Therapists subgroup reported that they performed 26 of the 42 tasks; and 12 tasks were reported as being performed by 25 percent to 74 percent of the respondents in this group. Seventy-five percent of the group identified as Administrators/Supervisors reported performing 30 of the 42 tasks. Only one task was performed by less than 24 percent of this subgroup. The remaining 11 tasks were performed by 25 percent to 74 percent of the respondents identified as Administrators/Supervisors.

Frequency

A mode frequency of 1 (several times a day) was reported for 18 of the 42 tasks in this category by all respondents; a mode frequency of 1 was reported for an additional seven tasks by the subgroups identified as Administrators/Supervisors, Therapists, and Technicians. One additional task was reported as being performed several times a day by Administrators/Supervisors and by Therapists. Only nine tasks listed in this category had a mode frequency of performance of once a week or less.

An examination of the tasks indicates that Aides/Orderlies predictably do not perform those tasks generally considered to include critical elements as frequently as other subgroups.

Difficulty

No task in this functional category was classified as difficult by the survey respondents. Eight of the tasks were considered to be moderately difficult and 34 were considered to be easy. Tasks considered to be moderately difficult were: Task No. 4.1, "Operate the defibrillator," Task No. 4.2, "Operate the respirators," Task No. 4.4, "Administer or

assist with exercise conditioning," Task No. 4.11, "Recognize complications of or adverse reactions to treatments," Task No. 4.16, "Perform chest physiotherapy," Task No. 4.17, "Perform intubations," and Task No. 4.2, "Operate respirators."

An apparent contradiction in the respondents' replies in reporting the difficulty of performing a task is noted in Task No. 4.2, "Operate respirators." The primary task, "Operate respirators," was judged to be moderately difficult, whereas each of the listed subpoints, treatments (IPPB), assistors, and controllers were judged to be easy tasks. There is no obvious explanation for this inconsistency.

TABLE 8

CLERICAL AND MISCELLANEOUS TASKS

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mean Difficulty
5.1	Plan own work flow.	[1]*†	1	1	1	1	1†
5.2	Maintain physical condition of facilities and equipment.	[1]	1	1	1	2	1
5.3	Schedule appointments with patients.	1	1	1	1	2	1
5.4	Answer telephone.	1	1	1	1	1	1
5.5	Transport patients.	2	3	2	3	3	1
5.6	Mount ECG records.	#	#	#	#	#	1
5.7	Use isolation techniques.	[3]	[2]	[3]	4	2	1
5.8	Service O_2 delivery system.	#	1	#	1	#	1
5.9	Maintain anesthetic gas supply.	1	4	#	#	#	1
5.10	Use hypothermic technique(s).	#	3	#	#	#	1
5.11	Alter respirator settings on basis of blood gas data.	[1]	[1]	1	#	#	2
5.12	Alter respirator settings on basis of observations.	[1]	[1]	1	1	1	2
5.13	Improvise or modify equipment for special requirements.	[3]	3	3	#	3	2
5.14	Stock and dispense cylinder gas.	[1]	1	2	2	2	1
5.15	Stock departmental drugs.	2	#	#	3	#	1
5.16	Mix and measure drug doses which you use.	[1]	[1]	1	1	1	1

Key: *Percentage of respondents performing
- a. 0 = No one in the occupational subgroup reported performing the task.
- b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
- c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
- d. [ ] = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (†)
- 1 = several times a day
- 2 = once a day--several times per week
- 3 = once a week--several times a month
- 4 = once a month or less

Difficulty (‡)
- 1 = easy
- 2 = moderately difficult
- 3 = difficult

** = insufficient n

TABLE 8 (Continued)

CLERICAL AND MISCELLANEOUS TASKS

Task Number	TASKS	Administrators/ Supervisors	Therapists	Technician	Aides/ Orderlies	Other Miscellaneous	Mode Difficulty
5.17	Report treatment given on patients' charts.	[1]	1	1	1	1	1
5.18	Read patients' charts.	[1]	1	1	1	1	1

Key: *Percentage of respondents performing
a. 0 = No one in the occupational subgroup reported performing the task.
b. # = From 1 to 24 of the respondents in subgroup indicated performing the task.
c. _ = From 25 to 74 percent of the subgroup indicated performing the task.
d. [ ] = More than 75 percent of the occupational subgroup reported performing the task.

Frequency (:)
1 = several times a day
2 = once a day--several times per week
3 = once a week--several times a month
4 = once a month or less

Difficulty (:)
1 = easy
2 = moderately difficult
3 = difficult

5. Clerical and Miscellaneous Tasks

Eighteen tasks were listed in this classification. Five of the activities or tasks are clerical in nature; the remainder are miscellaneous functions which may be performed in a Respiratory Care Department.

Performance

As in all of the other categories, the Administrators/Supervisors subgroup had the highest percentage of response for this category of tasks. The percentage of respondents who reported performing clerical and miscellaneous functions was higher for the Therapists subgroup than for the Technicians subgroup, which in turn was higher than the Aides/Orderlies subgroup. Ten of the 18 tasks were reported as being performed by 75 percent or more of the Administrators/Supervisors subgroup. Of the remaining eight tasks, only three were reported as being performed by less than 24 percent of this subgroup. Those tasks were: Task No. 5.6, "Mount ECG records," Task No 5.8, "Service O_2 delivery system," and Task No. 5.10, "Use hypothermic technique(s)." The subgroup of Therapists reported that four tasks were performed by more than 75 percent of the respondents. Only one, Task No. 5.6, "Mount ECG records," was performed by less than 24 percent of the Therapists subgroup. Seventy-five percent of the Technicians subgroup reported performing Task No. 5.7, "Use isolation techniques." Task No. 5.5, "Transport patients," Task No. 5.8, "Service O_2 delivery system," Task No. 5.9, "Maintain anesthetic gas supply," and Task No. 5.10, "Use hypothermic technique(s)," were reported as being performed by less than 24 percent of the personnel identifying themselves as Technicians.

No task in this category was reported as being performed by more than 75 percent of the personnel identifying themselves as Aides/Orderlies. This same group indicated five tasks which were performed by less than 24 percent of the respondents: Task No. 5.6, "Mount ECG records," Task No. 5.8, "Service O_2 delivery system," Task No. 5.9, "Maintain anesthetic gas supply," Task No. 5.10, "Use hypothermic technique(s)," and Task No. 5.11, "Alter respirator settings on basis of blood gas data."

Frequency

The frequency mode reported ranged from 1 to 4; most tasks had a mode frequency of performance of 1 (several times a day). Only three tasks, Task No. 5.7, "Use isolation techniques," Task No. 5.13, "Improvise or modify equipment for special requirements," and Task 5.15, "Stock departmental drugs," were reported as having a mode frequency greater than 1 (less frequent performance).

Difficulty

The most difficult tasks were: (1) Task No. 5.11, "Alter respirator settings on the basis of blood gas data," (2) Task No. 5.12, "Alter respirator settings on basis of observations," and (3) Task No. 5.13, "Improvise or modify equipment for special requirements." Each of these tasks had a mode difficulty index of 2 (moderate). The remaining tasks in this category were indicated as 1 (easy).

VII. CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Conclusions

Within the limitations of the sample, the following conclusions appear warranted:

1. Individuals employed at various occupational levels indicated (by way of self-administered survey questionnaire) little differentiation in the performance of those tasks which were listed on the survey instrument.

2. Based on the data reported in Tables 2 and 3 (pages 7 and 8), it would seem as though there is a relationship between hospital size and the existence of a Respiratory Care or Inhalation Therapy department. For example, a close inspection of the aforementioned tables indicates that a preponderance of the survey respondents were employed in large hospitals, 200 beds or more. And, at the same time, one may note that there were no personnel nor were there Respiratory Care or Inhalation Therapy departments reported at those extended-care facilities which are a part of the AHPP survey sample. Thus, the preceding conclusion which related hospital size to the existence of a formal department of Inhalation Therapy or Respiratory Care seems justified. In addition, the dispersion of survey respondents among hospitals of various sizes clearly indicates a trend which favors the larger institutions.

3. The survey data did not indicate the existence of a well-defined career ladder nor did the data indicate that health workers in other professions were becoming certified or employed in Respiratory Care or Inhalation Therapy departments. Survey respondents indicated a very wide variety of previous work experience. (It would be interesting to replicate this portion of the study in order to ascertain if occupational mobility, horizontal and vertical, exists within the allied health occupations in general and if career opportunities do exist in the Inhalation Therapy or Respiratory Care area.)

4. Several trends were observable which pertain to equipment functions; there was a very slight trend which indicated that Aides/Orderlies perform cleaning operations more frequently (based on percentage performing) than did the other groups. On the other hand, as complexity of the equipment functions increased, the percentage of Aides/Orderlies responding decreased and the percentage of the remaining position titles performing these functions increased.

Implications of the Study

The primary purpose of conducting this study was to determine the specific tasks or set of tasks which may be performed by a specific level of personnel employed either in an Inhalation Therapy or Respiratory Care department.

A hierarchical ordering of task groups (shown in the following tables) has been defined on the basis of this survey; four distinct sets of tasks are

identifiable. For the purpose of consistency with the survey data, these sets may conceivably be assigned to: Aides/Orderlies, Technicians, Therapists, and Administrators/Supervisors. With the exception of four tasks (denoted by an asterisk), the sets of tasks are built one upon the other. For example, the Administrators/Supervisors task list includes all of the tasks listed for the preceding levels of personnel. Grouping was done on the basis of the information contained in Tables 4 through 8 and data shown in Appendix VII.

Thirty-seven of the tasks listed on the survey questionnaire were not included in the previous tables. These are tasks which are not reported as being performed by many personnel in Inhalation Therapy or Respiratory Care departments. It should be remembered that the survey was designed to sample the entire range of functions which may be found within the occupational area. Those listed in the tables may be considered as: tasks which are not in the domain of Inhalation Therapy; tasks which are specific to a particular type of hospital or environment; or tasks which are just now emerging as Inhalation Therapy responsibilities.

HIERARCHICAL ORDER OF TASKS FOR AIDES/ORDERLIES

Administration and Supervision

1.2 Establish and maintain safety standards.

Diagnostic Techniques

3.11 Induce and collect sputum samples

Therapeutic Techniques

4.2 Operate respirators

- a. Treatment (IPPB)
- b. Assistors

4.3 Aerosol generators

- a. Vaporizers (steam)
- b. Bubbler type
- c. Jet type

4.5 Humidifiers

- a. Nebulizer type
- c. Ultrasonic type

4.6 O_2 Administration

- a. Nasal devices
- b. Masks
- c. Tents

4.9 Perform artificial respiration

4.11 Recognize complications of/or adverse reactions to treatments.

4.19 Use portable (tank) O_2 in treatments.

4.20 Use piped O_2 in treatments

4.22 Use pharmacological aids as directed

- a. Bronchodilators

4.23 Apply sterile techniques

Clerical and Miscellaneous

5.1 Plan own work flow

AIDES/ORDERLIES (continued)

5.2 Maintain physical condition of facilities and equipment

5.4 Answer telephone

5.5 Transport patients

5.7 Use isolation techniques

5.14 Stock and dispense cylinder gas

5.17 Report treatment given on patient's chart

5.18 Read patient's chart

The foregoing list and those that follow do not imply that the listed tasks should be performed by this particular level of personnel. They are simply indications of present practice, as revealed by the survey data.

HIERARCHICAL ORDER OF TASKS FOR TECHNICIANS

Technicians perform all of the tasks previously listed, plus those listed below.

Administration and Supervision

1.3 Establish and maintain standards of hygiene

Education - Training - Research

2.2 Teach inhalation therapy procedures to:

a. Patients (e.g., postural drainage)
d. Nursing staff

Diagnostic Techniques

3.20 Perform pulmonary function tests

b. Spirometry

3. Bedside spirometry

Therapeutic Techniques

4.2 Operate respirators

c. Controllers

4.7 Operate CO_2 rebreathers

4.8 Perform closed chest cardiac massage (emergency care)

4.10 Recognize expected reactions to treatment

4.12 Know the contraindications of treatments

4.14 Use suctioning equipment

4.15 Assist with postural drainage

4.18 Give tracheostomy care

4.21 Use mixed gases in treatments

4.22 Use pharmacological aids as directed.

b. Detergents
c. Mucolytics
e. Antibiotics
g. Antifoam agents

TECHNICIANS (continued)

Clerical and Miscellaneous

5.11 Alter respirator settings on basis of blood gas data

5.12 Alter respirator settings on basis of observations

5.13 Improvise or modify equipment for special requirements.

5.14 Mix and measure drug doses which you use.

HIERARCHICAL ORDER OF TASKS FOR THERAPISTS

Therapists perform all of the tasks previously listed, plus those listed below.

Administration and Supervision

1.5 Perform inventory of supplies and equipment

1.17 Evaluate equipment performance

1.19 Check equipment specifications

Education - Training - Research

2.2 Teach inhalation therapy procedures to:

b. Department members
c. Clinical students

2.3 Teach safety techniques to:

e. Medical staff

2.6 Orient new employees to hospital

Diagnostic Techniques

3.12 Collect tracheal-bronchial secretions

3.14 Measure vital signs

3.15 Evaluate vital signs

3.20 Perform pulmonary function tests

b. Spirometry

1. (Forced) vital capacity
3. Bedside

Therapeutic Techniques

4.5 Humidifiers

b. Centrifuge type

4.6 O_2 Administration

d. Incubators

4.22 Use pharmacological aids as directed

d. Proteolytic enzymes

THERAPISTS (continued)

Clerical and Miscellaneous

5.8 Service O_2 delivery system

5.9 Maintain anesthetic gas supply

HIERARCHICAL ORDER OF TASKS FOR ADMINISTRATORS/SUPERVISORS

Administrators/Supervisors perform all of the tasks previously listed, plus those listed below.

Administration and Supervision

1.1 Supervise departmental public relations and information service

1.4 Establish an inventory system

1.6 Plan departmental work flow

1.8 Coordinate work schedules with other departments

1.9 Draft departmental budget estimates

1.10 Draft job descriptions

1.11 Determine staff requirements

1.12 Develop departmental evaluation procedures

1.13 Develop departmental hiring procedures

1.14 Interview prospective employees and recommend action

1.15 Develop departmental procedure manual

1.16 Develop departmental policy manual

1.18 Initiate purchase orders

1.20 Organize staff meetings

1.21 Prepare statistical reports

1.22 Establish departmental charge system

1.23 Attend relevant hospital management meetings

Education - Training - Research

2.4 Participate in relevant community health projects

2.5 Participate in "health career" promotion

2.7 Develop education and/or training programs

a. On-the-job training programs
b. In-service training programs
c. Inhalation therapy school programs

ADMINISTRATORS/SUPERVISORS (continued)

Diagnostic Techniques*

3.2 Perform gas analysis

c. Blood gas tensions

3.5 Measure blood pH

3.9 Perform calculations for pulmonary function tests

3.10 Compare pulmonary function test results with norms

3.13 Perform and assist with arterial punctures

3.18 Perform auscultation

3.20 Perform pulmonary function tests

b. Spirometry

2. Slow vital capacity

c. Maximum voluntary ventilation (MVC)

Therapeutic Techniques

4.16 Perform chest physiotherapy

Clerical and Miscellaneous **

5.15 Stock departmental drugs

*Delete task # 3.20 b3 "Perform pulmonary function tests"

Spirometry

Bedside spirometry

**Delete task #5.5 "Transport patients"

5.8 "Service O_2 delivery system"

5.9 "Maintain anesthetic gas supply"

TASKS NOT PERFORMED

Education - Training - Research

- 2.1 Conduct or assist in research
- 2.8 Design and implement home care programs

Diagnostic Techniques

- 3.1 Operate ECG recorder
- 3.2 Perform gas analysis
  - a. simple
  - b. multiple
- 3.3 Operate pressure transducers
- 3.4 Administer and assist in exercise testing
- 3.6 Operate multi-channel recorder(s)
- 3.8 Assist with cardiac catheterization
- 3.16 Recognize artifacts in ECG record
- 3.17 Identify wave forms of ECG
- 3.19 Measure blood pressure
- 3.20 Perform pulmonary function tests
  - a. Functional residual capacity
    1. Nitrogen wash-out
    2. Helium dilution
    3. Body box (Plethysmography)
  - d. Expired air collection and analysis
  - e. Diffusion capacity
  - f. Compliance measurements
  - g. Airway resistance measurements
  - h. Measure alveolar p CO_2
  - i. Estimate arterial p CO_2 (via rebreathing technique)
  - j. Measure cardiac output
    1. Fick principle
    2. Indicator dilution technique
    3. Plethysmography
  - k. Pneumotachometer
  - l. Radioactive gas techniques (ventilation/perfusion).

Therapeutic Techniques

- 4.1 Operate defibrillator
- 4.4 Administer or assist with exercise conditioning
- 4.13 Assist with or perform hyperbaric procedures
- 4.17 Perform intubations
- 4.22 Use pharmacological aids as directed

e. antibiotics
f. steroids

Clerical and Miscellaneous

5.6 Mount ECG records
5.16 Use hypothermic technique(s)

APPENDIX I

LIST OF HEALTH CARE FACILITIES SELECTED FOR NATIONAL SURVEY

BIRMINGHAM

200 Beds or More	Baroness Erlanger Hospital	Chattanooga, Tennessee
	Baptist Medical Center	Birmingham, Alabama
100-199 Beds	Jeff Anderson Memorial Hosp.	Meridian, Mississippi
	St. Judes Catholic Hospital	Montgomery, Alabama
Under 100 Beds	Sam Howell Memorial Hospital	Cartersville, Georgia
	Athens-Limestone Hospital	Athens, Alabama
Extended-Care Fac.	Plantation Manor	McCalla, Alabama
	St. Lukes Nursing Home	Birmingham, Alabama

BOSTON

200 Beds or More	Peter Bent Brigham Hospital	Boston, Massachusetts
	Memorial Hospital	Worcester, Massachusetts
100-199 Beds	Faulkner Hospital	Boston, Massachusetts
	Thayer Hospital	Waterville, Maine
Under 100 Beds	Mary Lane Hospital	Ware, Massachusetts
	Falmouth Hospital	Falmouth, Mass.
Extended-Care Fac.	Hebrew Rehab. Center for Aged	Boston, Massachusetts
	Cambridge Nursing Home	Cambridge, Massachusetts

CHICAGO

200 Beds or More	Chicago Wesley Memorial Hosp.	Chicago, Illinois
	Memorial Hospital	Kenosha, Wisconsin
100-199 Beds	Delnor Hospital	St. Charles, Illinois
	Beloit Memorial Hospital	Beloit, Wisconsin
Under 100 Beds	DeKalb Public Hospital	Dekalb, Illinois
	Bethany Brethren Hospital	Chicago, Illinois
Extended-Care Fac.	Hearthside Nursing Home	Chicago, Illinois
	Fox River Rehab. Center	Chicago, Illinois

DENVER

200 Beds or More	St. Marys Hospital	Grand Junction, Colorado
	St. Lukes Hospital	Denver, Colorado
100-199 Beds	Memorial Hospital of Laramie County	Cheyenne, Wyoming
	Poudre Valley Memorial Hosp.	Fort Collins, Colorado
Under 100 beds	Alamosa County Hospital	Alamosa, Colorado
	Longmont Community Hospital	Longmont, Colorado
Extended-Care Fac.	Ivy Manor Nursing Home	Denver, Colorado
	Eventide Nursing Home	Longmont, Colorado

LOS ANGELES

200 Beds or More	Kaiser Foundation Hospital	Panorama City, Californi
	Santa Monica Hospital	Santa Monica, California
100-199 Beds	Morningside Hospital	Los Angeles, California
	West Valley Community Hosp.	Encino, California
Under 100 Beds	Community Hospital of Gardena	Gardena, California
	Garden Park General Hosp.	Anaheim, California
Extended-Care Fac.	Kaiser Extended-Care Fac.	Panorama City, Californi
	Culver City Convalescent Hospital	Los Angeles, California

SEATTLE

200 Beds or More	St. Francis Xavier Cabrini Hospital	Seattle, Washington
	Emmanuel Hospital	Portland, Oregon
100-199 Beds	St. Josephs Hospital	Aberdeen, Washington
	Vancouver Memorial Hospital	Vancouver, Washington
Under 100 Beds	Tri-State Memorial Hospital	Clarkston, Washington
	West Seattle General Hosp.	Seattle, Washington
Extended-Care Fac.	Mt. Baker Convalescent Home	Seattle, Washington
	L. C. Foss Sunset House	Seattle, Washington

APPENDIX II

SUPPLEMENTARY SURVEY SITES

1. Good Samaritan Hospital
   10th and McDowell
   Phoenix, Arizona

2. L. D. S. Hospital
   8th Avenue & C Street
   Salt Lake City, Utah

3. Yale-New Haven Hospital
   New Haven, Connecticut

4. Hospital of St. Raphael
   New Haven, Connecticut

5. St. Mary's Hospital
   Rochester, Minnesota

6. Methodist Hospital
   Rochester, Minnesota

7. Mt. Carmel Mercy Hospital
   Detroit, Michigan

8. St. Marys Hospital
   Grand Rapids, Michigan

9. Mount Sinai Hospital
   Miami Beach, Florida

10. Orange Memorial Hospital
    Orlando, Florida

11. Kansas University Medical Center
    Rainbow & Olathe Boulevards
    Kansas City, Kansas

12. University of Rochester Medical Center
    260 Crittenden Boulevard
    Rochester, New York

13. White Memorial Hospital
    1720 Brooklyn Avenue
    Los Angeles, California

14. U.C.L.A. Medical Center
    Los Angeles, California

APPENDIX III TASKS INVOLVED IN MAINTENANCE FUNCTIONS

PERCENTAGE OF RESPONDENTS WHO REPORTED
PERFORMANCE OF EQUIPMENT RELATED TASKS

TASKS	CLEAN					STERILIZE					PREVENTIVE MAINTENANCE					REPAIR				
	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6
3.1 Operate ECG recorder.	7	2	1	5	7	5	0	0	0	0	2	0	1	0	0	2	0	1	0	0
3.2 Perform gas analysis.	25	7	11	11	0	7	2	3	0	0	18	5	10	0	0	13	5	5	5	0
a. Simple	12	4	7	11	0	5	2	1	0	0	10	8	5	0	0	7	5	3	5	0
b. Multiple	5	2	8	5	0	0	2	3	0	0	2	2	6	0	0	0	2	5	5	0
c. Blood gas tensions	28	7	9	5	14	10	2	1	0	0	15	2	6	0	14	10	2	6	5	14
3.3 Operate pressure transducers.	5	2	1	10	7	0	2	1	5	7	5	0	0	11	7	5	0	1	11	0
3.5 Measure blood pH.	33	11	13	0	35	5	0	1	0	0	21	5	8	0	28	15	0	5	0	21
3.6 Operate multi-channel recorder(s).	2	0	0	0	7	2	0	0	0	0	5	0	0	0	7	5	0	0	0	0
3.7 Operate telemetry system(s).	2	0	1	0	7	0	0	1	0	7	0	0	1	0	7	0	0	0	0	0
3.11 Induce and collect sputum samples.	18	27	14	21	14	28	25	8	16	14	28	25	3	5	7	21	19	1	5	0
3.12 Collect tracheal-bronchial secretions.	20	16	6	5	0	13	8	5	0	0	13	16	3	0	0	13	11	3	0	0
3.13 Perform and assist with arterial punctures.	12	5	11	5	7	9	0	3	5	7	5	0	3	0	0	2	0	3	0	0
3.14 Measure vital signs.	7	10	1	5	0	2	8	0	0	0	10	8	0	0	0	5	5	1	0	0
3.18 Perform auscultation.	7	2	4	5	7	2	2	3	0	0	7	2	3	0	0	2	2	3	0	0
3.20 Perform pulmonary function tests.	23	7	13	16	14	23	5	10	11	21	23	8	5	5	0	21	5	3	0	7
a. Functional residual capacity	7	5	1	5	7	7	5	1	5	7	10	5	1	5	0	5	2	1	0	0
1. Nitrogen wash out	2	2	0	5	0	2	2	0	5	0	5	5	0	5	0	2	2	0	0	0
2. Helium dilution	2	5	3	0	7	4	5	3	0	0	10	5	1	0	7	5	2	1	0	7
3. Body box (Plethysmograph)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
b. Spirometry	15	7	12	10	0	13	5	6	5	0	15	8	6	0	0	15	5	3	0	0

Key: Group 1 Administrator/Supervisor
Group 3 Therapists
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

PERCENTAGE OF RESPONDENTS WHO REPORTED
PERFORMANCE OF EQUIPMENT RELATED TASKS
(Continued)

TASKS	CLEAN					STERILIZE					PREVENTIVE MAINTENANCE					REPAIR				
	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6
1. Forced vital capacity	25	7	6	10	7	18	5	3	5	0	21	8	3	0	7	13	5	3	0	7
2. Slow vital capacity	20	7	3	10	14	18	7	3	5	0	21	8	3	0	7	13	5	3	0	7
3. Bedside spirometry	15	4	13	5	0	15	2	8	0	0	15	8	8	0	0	13	2	6	0	0
c. Maximum voluntary ventilation (MVC)	20	7	9	10	7	15	5	6	5	0	18	5	5	0	7	13	2	5	0	7
d. Expired air collection and analysis	5	2	0	5	7	7	2	0	5	0	7	2	0	5	7	5	2	0	5	7
e. Diffusion capacity	0	0	0	5	0	2	0	0	5	0	7	2	0	0	0	5	0	0	0	0
f. Compliance measurements	0	0	3	0	0	0	0	0	0	0	2	2	0	0	0	2	0	0	0	0
g. Airway resistance measurements	0	0	1	0	0	0	0	0	0	0	2	2	0	0	0	2	0	0	0	0
h. Measure alveloar p Co_2	2	4	4	5	7	2	2	1	5	0	2	5	1	0	0	2	2	1	0	0
i. Estimate arterial p Co_2 (via rebreathing technique)	2	0	1	0	0	2	0	1	0	0	2	0	0	0	0	2	0	0	0	0
j. Measure cardiac output	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1. Fick principle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Indicator dilution technique	5	0	0	0	0	5	0	0	0	0	2	0	0	0	0	2	0	0	0	0
3. Plethysmography	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0	2	0	0	0	0
k. Pneumotachometer	2	2	1	0	0	2	2	0	0	0	2	0	0	0	0	2	0	0	0	0
l. Radioactive gas techniques (ventilation/perfusion)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Key: Group 1 Administrator/Supervisor
Group 3 Therapists
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

PERCENTAGE OF RESPONDENTS WHO REPORTED
PERFORMANCE OF EQUIPMENT RELATED TASKS
(Continued)

TASKS	CLEAN					STERILIZE					PREVENTIVE MAINTENANCE					REPAIR				
	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6
4.1 Operate defibrillator.	7	0	2	5	0	0	0	1	5	0	2	0	1	0	0	2	0	0	0	0
4.2 Operate respirators.	47	66	45	44	42	52	55	27	22	35	63	61	34	16	14	44	55	20	16	7
4.3 Aerosol generators.	44	44	24	38	14	46	38	18	16	7	57	38	20	16	7	38	38	10	16	7
a. Vaporizers (steam)	46	27	25	38	28	41	16	13	11	14	57	19	22	11	14	36	25	10	11	7
b. Bubbler type	47	47	27	54	35	52	38	2	27	21	55	47	24	16	15	36	44	13	15	14
c. Jet type	44	47	30	43	35	52	38	21	27	21	52	47	20	16	14	36	44	12	16	14
4.5 Humidifiers.	44	66	53	60	35	54	46	30	33	28	55	61	29	27	14	42	58	15	22	0
a. Nebulizer type	36	60	49	66	42	49	49	31	50	35	55	58	29	22	21	39	50	20	22	14
b. Centrifuge type	31	30	15	27	35	41	25	10	5	28	42	36	15	11	14	31	30	10	11	7
c. Ultrasonic type	44	60	49	54	49	52	43	34	27	42	55	63	31	16	28	39	50	15	16	14
4.6 O_2 Administration.	52	54	21	43	21	42	43	16	27	14	47	47	22	16	14	31	41	13	16	0
a. Nasal devices	33	52	27	54	7	28	49	13	38	0	31	47	17	11	7	18	41	10	11	7
b. Masks	39	52	25	60	14	31	49	13	44	0	34	50	17	16	7	21	44	10	16	7
c. Tents	38	63	29	44	21	43	49	13	33	7	42	63	17	11	21	34	58	12	16	0
d. Incubators	18	16	2	10	7	15	8	1	10	7	31	16	8	0	0	15	19	6	[illegible]	7
4.7 Operate CO_2 rebreathers.	28	21	20	21	35	20	16	12	21	21	23	18	8	5	14	13	13	6	5	0
4.13 Assist with or perform hyperbaric procedures.	2	0	0	0	0	4	0	0	0	0	7	0	0	1	0	2	0	0	0	0
4.14 Use suctioning equipment.	26	18	20	11	35	18	5	11	0	21	26	16	10	5	7	21	8	5	5	7

Key: Group 1 Administrator/Supervisor
Group 3 Therapists
[illegible]

PERCENTAGE OF RESPONDENTS WHO REPORTED
PERFORMANCE OF EQUIPMENT RELATED TASKS
(Continued)

TASKS	CLEAN					STERILIZE					PREVENTIVE MAINTENANCE					REPAIR				
	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6
4.17 Perform intubations.	15	2	8	0	7	12	2	8	0	7	7	2	5	0	7	2	2	3	0	7
4.18 Give tracheostomy care.	7	10	1	5	0	2	8	0	0	0	10	8	0	0	0	5	5	1	0	0
4.19 Use portable (tank) 0_2 in treatments.	20	27	11	16	7	9	16	3	5	7	31	41	17	11	21	18	27	8	11	7
4.20 Use piped 0_2 in treatments.	17	18	9	21	7	17	13	4	16	7	28	25	17	16	21	23	22	10	16	7
4.21 Use mixed gases in treatments.	28	5	12	0	0	20	5	6	0	0	26	11	6	0	0	15	5	5	0	0
4.23 Apply sterile techniques.	38	21	33	44	49	38	13	18	49	28	26	19	8	11	0	13	16	3	11	0

Key: Group 1 Administrator/Supervisor
Group 3 Therapists
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

PERCENTAGE OF RESPONDENTS WHO REPORTED
PERFORMANCE OF EQUIPMENT RELATED TASKS
(Continued)

TASKS	CLEAN					STERILIZE					PREVENTIVE MAINTENANCE					REPAIR				
	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6	1	3	4	5	6
5.5 Transport patients.	10	5	8	5	0	5	5	3	5	0	5	11	6	5	0	2	11	6	5	0
5.7 Use isolation techniques.	28	27	26	27	42	28	19	21	21	35	18	16	8	11	7	5	8	5	5	0
5.8 Service O_2 delivery system.	9	8	6	21	7	7	8	3	16	0	26	19	10	22	7	21	22	6	11	7
5.9 Maintain anesthetic gas supply.	2	2	1	0	0	2	2	0	0	0	7	13	1	0	0	2	8	0	0	0
5.10 Use hypothermic technique(s).	5	10	2	5	7	5	8	1	5	0	7	13	1	5	0	5	11	1	5	0
5.11 Alter respirator settings on basis of blood gas data.	20	18	11	5	0	25	13	10	0	0	28	19	6	0	0	21	16	5	0	0
5.12 Alter respirator settings on basis of observations.	39	24	15	10	14	36	22	5	5	0	47	25	10	11	0	39	22	5	11	0
5.13 Improvise or modify equipment for special requirements.	30	24	23	10	0	28	22	17	5	0	36	38	17	11	7	34	36	13	11	7
5.14 Stock and dispense cylinder gas.	7	10	7	11	0	5	2	1	0	0	18	13	8	5	7	5	5	0	5	7
5.16 Mix and measure drug doses which you use.	15	7	19	10	14	15	5	7	10	7	15	5	5	0	0	2	2	5	0	0

Key: Group 1 Administrator/Supervisor
Group 3 Therapists
Group 4 Technician
Group 5 Aide/Orderly

APPENDIX IV

Respiratory Care Survey

Allied Health Professions Project
Division of Vocational Education
University of California, Los Angeles

This is part of a project to develop new courses of study and instructional materials for persons in the allied health professions. To find out what should be taught and how best to teach it, we must find out what tasks or functions really are performed by persons such as you who are working in the field.

We are asking the cooperation, therefore, of employees in a small, selected group of hospitals throughout the United States. You are one of these employees. YOUR ANSWERS ARE IMPORTANT!!

This is a confidential document for research purposes only. Your identification card will be kept separate from your answers to the questionnaire. Answers will be prepared for data processing and results will be reported by group only, not by individual.

Respondent I.D. Number

BACKGROUND INFORMATION SHEET

ID number_____

Please complete this information sheet and return it with the survey form. The answers to these questions are of importance as we try to evaluate responses from a large number of people across the United States where educational and licensure requirements for specific jobs may be very different.

THIS IS A CONFIDENTIAL DOCUMENT IDENTIFIED BY NUMBER ONLY.

THIS INFORMATION WILL BE USED FOR RESEARCH PURPOSES ONLY.

1. Your position title_____

2. Department_____

3. Your major area of responsibility_____

4. Years in present position_____

5. Years in occupation_____

6. Previous occupation_____

7. Years in previous occupation_____

8. Age_____

9. Sex (circle) M F

10. Highest school grade completed (circle one)

less than 8	9	9	10	11	12	more than 12

(Continued on next page)

11. Highest academic level completed (circle one)

11.1 Less than high school diploma

11.2 High school diploma or equivalent

11.3 Some college (no degree)

11.4 Associate degree

11.5 Bachelor's degree (major) _____

11.6 Master's degree (major) _____

11.7 Other (specify) _____

12. Technical or other training program(s) completed (circle)

	Months	Area or Subject
12.1 None		
12.2 On-job or apprenticeship	_____	_____
12.3 Military courses	_____	_____
12.4 Manufacturers' courses	_____	_____
12.5 Vocational school	_____	_____
12.6 Certificate or diploma program	_____	_____
12.7 Other courses	_____	_____
	_____	_____

13. Certificates, licenses or registrations held (specify) _____

14. Are you employed full time in your present position? (circle) YES NO

15. Present yearly hospital salary (circle one)

14.1 less than $2000

14.2 $2000 - 3999

14.3 $4000 - 5999

14.4 $6000 - 7999

14.5 $8000 - 9999

14.6 $10000 - 11999

14.7 $12000 - 15000

14.8 more than $15000

SURVEY DIRECTIONS

Read each task statement in the list. If you perform the task in your job, place a check mark in the first column after the statement. If you supervise performance of the task by other persons, place a check mark in the second column.

For each task that you perform (and have checked in the first column), place an X mark in one of the squares of the Frequency column and in one of the squares of Difficulty column to indicate your answers to the following questions:

A. Frequency: How often do you perform this task?

1. Several times a day
2. Once a day or several times a week
3. Once a week or several times a month
4. Once a month or less often

B. Difficulty: How difficult is this task?

1. Easy: You follow a standard procedure that does not require any decisions; you never have to consult a procedure manual or a supervisor.

2. Moderate: You have to select the most suitable procedures to fit different conditions or situations; you sometimes have to consult a procedure manual or a supervisor.

3. Difficult: You encounter problems that may require changes in procedures or the use of new procedures; you usually have to consult a procedure manual or a supervisor.

C. Equipment Functions:

1. You clean equipment used in performing the task
2. You sterilize equipment used in performing the task
3. You do preventive maintenance to the equipment used in performing the task
4. You repair the equipment used in performing the task

Step one: Read the entire task list, check those tasks which you perform or supervise.

Step two: For those tasks checked in step one, indicate with an "X" the frequency and difficulty of performance.

Step three: For those tasks checked in step one, indicate with an "X" in the appropriate square if you perform any equipment functions.

	Check if you perform this task	Check if you supervise the performance of this task	FREQUENCY X How often do you perform this task? Several times a day	Once a day or several times a week	Once a week or several times a month	Once a month or less	DIFFICULTY X How difficult is this task? Easy	Moderate	Difficult	EQUIPMENT FUNCTIONS Check each one that you do. Clean	Sterilize	Preventive Maintenance	Repair
Apply sterile techniques (4.23)	☐	☐	1	2	3	4	1	2	3	1	2	3	4
Perform auscultation (3.18)	☐	☐	1	2	3	4	1	2	3	1	2	3	4
Assist with postural drainage (4.15)	☐	☐	1	2	3	4	1	2	3				
Use isolation techniques (5.7)	☐	☐	1	2	3	4	1	2	3	1	2	3	4
Know the contraindications of treatments (4.12)	☐	☐	1	2	3	4	1	2	3				
Use hypothermic technique(s) (5.10)	☐	☐	1	2	3	4	1	2	3	1	2	3	4
Determine staff requirements (1.11)	☐	☐	1	2	3	4	1	2	3				
Alter respiratory settings on basis of blood gas data (5.11)	☐	☐	1	2	3	4	1	2	3	1	2	3	4
Operate defibrillator (4.1)	☐	☐	1	2	3	4	1	2	3	1	2	3	4
Plan departmental work flow (1.6)	☐	☐	1	2	3	4	1	2	3				
Draft job descriptions (1.10)	☐	☐	1	2	3	4	1	2	3				
Assist with cardiac catheterization (3.8)	☐	☐	1	2	3	4	1	2	3				
Maintain physical condition of facilities and equipment (5.2)	☐	☐	1	2	3	4	1	2	3				
Draft departmental budget estimates (1.9)	☐	☐	1	2	3	4	1	2	3				
Operate telemetry system(s) (3.7)	☐	☐	1	2	3	4	1	2	3	1	2	3	4

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APPENDIX V

TASK LIST - RESPIRATORY CARE

Administration and Supervision

1.1 Supervise departmental public relations and information service.

1.2 Establish and maintain safety standards.

1.3 Establish and maintain standards of hygiene.

1.4 Establish an inventory system.

1.5 Perform inventory of supplies and equipment.

1.6 Plan departmental work flow.

1.7 Plan space requirements.

1.8 Coordinate work schedules with other departments.

1.9 Draft departmental budget estimates

1.10 Draft job descriptions.

1.11 Determine staff requirements.

1.12 Develop departmental evaluation procedures.

1.13 Develop departmental hiring procedures.

1.14 Interview prospective employees and recommend action.

1.15 Develop departmental procedure manual.

1.16 Develop departmental policy manual.

1.17 Evaluate equipment performance.

1.18 Initiate purchase orders.

1.19 Check equipment specifications.

1.20 Organize staff meetings.

1.21 Prepare statistical reports.

1.22 Establish departmental charge system.

1.23 Attend relevant hospital management meetings.

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Education - Training - Research

2.1 Conduct or assist in research.

2.2 Teach inhalation therapy procedures.

- a. Patients (e.g., postural drainage)
- b. Department members
- c. Clinical students
- d. Nursing staff
- e. Medical staff

2.3 Teach safety techniques.

2.4 Participate in relevant community health projects.

2.5 Participate in "health career" promotion.

2.6 Orient new employees to hospital and departmental procedures

2.7 Develop education and/or training programs.

- a. On-the-job training programs
- b. In-service training programs
- c. Inhalation therapy school programs

2.8 Design and implement home care programs.

Diagnostic Techniques

3.1 Operate ECG recorder.

3.2 Perform gas analysis.

- a. Simple
- b. Multiple
- c. Blood gas tensions

3.3 Operate pressure transducers.

3.4 Administer and assist in exercise testing.

3.5 Measure blood pH.

3.6 Operate multi-channel recorder(s).

3.7 Operate telemetry system(s).

3.8 Assist with cardiac catheterization.

3.9 Perform calculations for pulmonary function tests.

3.10 Compare pulmonary function test results with norms.

3.11 Induce and collect sputum samples.

3.12 Collect tracheal-bronchial secretions.

3.13 Perform and assist with arterial punctures.

3.14 Measure vital signs.

3.15 Evaluate vital signs.

3.16 Recognize artifacts in ECG record.

3.17 Identify wave forms of ECG.

3.18 Perform auscultation.

3.19 Measure blood pressure.

3.20 Perform pulmonary function tests.

- a. Functional residual capacity
  - 1. Nitrogen wash-out
  - 2. Helium dilution

3. Body box (Plethysmograph)

b. Spirometry

1. (Forced) vital capacity

2. Slow vital capacity

3. Bedside spirometry

c. Maximum voluntary ventilation (MVC)

d. Expired air collection and analysis

e. Diffusion capacity

f. Compliance measurements

g. Airway resistance measurements

h. Measure alveolar p Co_2

i. Estimate arterial p Co_2 (via rebreathing technique)

j. Measure cardiac output

1. Fick principle

2. Indicator dilution technique

3. Plethysmography

k. Pneumotachometer

l. Radioactive gas techniques (ventilation/perfusion)

Therapeutic Techniques

4.1 Operate defibrillator.

4.2 Operate respirators.

- a. Treatment (IPPB)
- b. Assistors
- c. Controllers

4.3 Aerosol generators.

- a. Vaporizers (steam)
- b. Bubbler type
- c. Jet type

4.4 Administer or assist with exercise conditioning.

4.5 Humidifiers.

- a. Nebulizer type
- b. Centrifuge type
- c. Ultrasonic type

4.6 O_2 Administration.

- a. Nasal devices
- b. Masks
- c. Tents
- d. Incubators

4.7 Operate Co_2 rebreathers.

4.8 Perform closed chest cardiac massage (emergency care).

4.9 Perform artificial respiration.

4.10 Recognize expected reactions to treatment.

4.11 Recognize complications of/or adverse reactions to treatments.

4.12 Know the contraindications of treatments.

4.13 Assist with or perform hyperbaric procedures.

4.14 Use suctioning equipment.

4.15 Assist with postural drainage.

4.16 Perform chest physiotherapy.

4.17 Perform intubations.

4.18 Give tracheostomy care.

4.19 Use portable (tank) O_2 in treatments.

4.20 Use piped O_2 in treatments.

4.21 Use mixed gases in treatments.

4.22 Use pharmacological aids as directed.

- a. Bronchodilators
- b. Detergents
- c. Mucolytics
- d. Proteolytic enzymes
- e. Antibiotics
- f. Steroids
- g. Antifoam agents

4.23 Apply sterile techniques

Clerical and Miscellaneous

5.1 Plan own work flow.

5.2 Maintain physical condition of facilities and equipment.

5.3 Schedule appointments with patients.

5.4 Answer telephone.

5.5 Transport patients.

5.6 Mount ECG records.

5.7 Use isolation techniques.

5.8 Service O_2 delivery system.

5.9 Maintain anesthetic gas supply.

5.10 Use hypothermic technique(s).

5.11 Alter respirator settings on basis of blood gas data.

5.12 Alter respirator settings on basis of observations.

5.13 Improvise or modify equipment for special requirements.

5.14 Stock and dispense cylinder gas.

5.15 Stock departmental drugs.

5.16 Mix and measure drug doses which you use.

5.17 Report treatment given on patients' charts.

5.18 Read patients' charts.

APPENDIX VI

Background Information on Survey Population

Table A portrays the selected position titles for the combined samples. Approximately 62% of all respondents indicated that their hospital department title was Inhalation Therapy; 23% indicated that the title was Respiratory Care department; and 9% indicated that their department was known as Pulmonary Care.

Table A

Respondents Position Title

Administrators/Supervisors	38
Nurses	5
Therapists	36
Technicians	58
Aides/Orderlies	18
Other	14
No Answer	7
	N=176

Table B is a cross-tabulation of the grouped position titles by the respondent's major area of responsibility. The primary significance of this table is that it reinforces the respondents' inclusion in a specific subgroup or position title. It is interesting to note that of the 32 individuals whose major responsibility is administration or supervision, 66% were grouped in the appropriate position title. There is no exact explanation for including those individuals who listed their major responsibility as being ICU/CCU, Respiratory Care, or Equipment Specialist in this position title group. Two probable reasons are: (1) the individual may have erroneously interpreted the question indicating his specific assignment; and (2) the variation of occupational titles within the sample may be very diverse. All of the Administrators/Supervisors who reported their major responsibility as "other" were educational specialists or directors. As expected, for those respondents who indicated position titles other than Administrators/Supervisors, the majority indicated that their primary responsibility was providing Inhalation Therapy/Respiratory Care.

TABLE B

Position Title and Major Responsibility

	Major Responsibilities						
	ICU/CCU	Inhalation Therapy	Administration/ Supervision	Equipment Specialist	Other	No Answer	Total
Administrators/ Supervisors	2	7	21	1	4	3	38
Nurses	0	5	0	0	0	0	5
Therapists	2	25	5	2	1	1	36
Technicians	1	37	4	4	4	8	58
Aides/ Orderlies	0	5	0	12	0	1	18
Other	1	5	2	1	3	2	14
No Answer	0	2	0	0	0	5	7
Total	6	86	32	20	12	20	N=176

Table C indicates the certification of all respondents in combination with their position title. It should be noted that the column headed "nurse" indicates: 6 RN's, 5 LVN's/LPN's and 5 nurse aides. For respondents who indicated more than one type of certification (e.g., nurse - CIT), the certification most related to respiratory care was designated as the primary certification. Respondents in this group included: 4 RN's, 6 LVN's/LPN's, and one nurse aide.

The position title with the largest percentage of certified personnel was the group designated Administrators/Supervisors.

TABLE C

Position Title and Certification Held

	ARIT	Nurse	CPT	CIT	None	Total
Administrators/ Supervisors	19	3	2	2	12	38
Nurses	0	4	0	0	1	5
Therapists	7	0	8	2	19	36
Technicians	2	7	1	4	44	58
Aides/ Orderlies	0	0	0	0	18	18
Other	0	2	0	0	12	14
No Answer	0	0	0	1	6	7
Total	28	16	11	9	112	N=176

Table D indicates the highest academic level completed for grouped position titles. Over 59% of all respondents indicated that they had completed some college course work, but less than 2% indicated they had not completed high school. The respondent who indicated completion of MS degree was a mechanical engineer. Of those respondents who indicated completion of a BA degree, approximately 60% were attained in science-related fields, one respondent indicated a BS degree in Inhalation Therapy. The remainder of those respondents who completed a BA received their degree in education or a related field.

TABLE D

Position Title and Highest Academic Level Completed

	Less than High School	High School or Equivalent	Some College	AA	BA	MA	Other	N.A.*	Total
Administrators/ Supervisors	0	6	21	7	2	0	2	0	38
Nurses	0	0	0	0	1	0	4	0	5
Therapists	0	11	16	5	3	0	0	1	36
Technicians	1	24	21	3	6	0	2	1	58
Aides/ Orderlies	1	6	10	0	0	0	0	1	18
Other	1	5	4	1	1	1	0	1	14
No Answer	0	2	1	1	0	0	0	3	7
Total	3	54	73	17	13	1	8	7	N=176

*No Answer

Table E presents information relating the respondents' grouped position titles to the respondents' previous occupations. The information given in the table does not indicate any trend of upward occupational mobility, nor does it indicate horizontal mobility among related occupations. Those respondents who indicated that their previous occupation was "student" were on the average younger than those respondents who indicated other previous occupations. It would be most interesting to replicate this portion of the study after several years in order to ascertain what proportion of the work force is being supplied by schools of Inhalation Therapy. A large number of respondents (50) indicated that their previous occupation was not included on the coded list. An examination of these responses revealed more than 28 distinct job titles. These job titles could be classed into three major subgroups: industry, sales, and health-related occupations. No trends in the data were descernible.

TABLE E

Position Title and Previous Occupation

	Previous Occupation								
	None	Military	Nursing	Teaching	Student	Orderly Aide	Other	*N.A.	Totals
Administrators/ Supervisors	2	6	5	1	6	5	11	2	38
Nurses	0	0	3	0	1	0	0	1	5
Inhalation Therapists	1	7	0	0	16	6	5	1	36
Technicians	4	9	5	0	11	3	21	5	58
Aides/ Orderlies	2	1	0	1	1	4	7	2	18
Other	0	1	0	0	3	3	5	2	14
No Answer	0	0	0	0	0	0	1	6	7
Totals	9	24	13	2	38	21	50	19	N=176

*No Answer

Table F shows the employment status of the respondents, and Table G reviews the mode salary for each of the grouped position titles.

TABLE F

Employment Status

Full-Time	156
Part-Time	12
No Answer	8
	N=176

TABLE G

Mode Salary for Position Title

Chief Therapists		$8,000 - 10,000	
Nurses		6,000 - 8,000	
Inhalation Therapists		6,000 - 8,000	
		2,000 - 4,000*	(n= 3)
Technicians		2,000 - 6,000	
		2,000 - 4,000*	(n= 4)
Aides/Orderlies		2,000 - 4,000	
	Less than	2,000 *	
Other		4,000 - 6,000	
		4,000 - 6,000*	(n= 2)
No Answer		4,000 - 6,000	
		2,000 - 4,000*	(n= 1)

*Part-time employees

TABLE H

Position Title and Respondents Mean Age -
Years in Present Position - Years in Occupation

	Mean Age (Range)	Years Present Position	Years Occupation
Administrators/ Supervisors	30.5 (20-58)	2.4*	6.4
Nurses	29.0 (21-43)	1.4	4.6
Therapists	25.6 (18-40)	2.6	3.9
Technicians	28.3 (18-47)	2.1	3.1
Aides/Orderlies	28.7 (17-63)	2.0	3.1
Other	Not completed	1.7	3.6
No Answer	Not completed	1.0	8.5

*All mean categories computed from number of cases responding

For each of the background information items, a chi square (χ^2) test of significance was made in order to determine if there was any significant difference between the two samples in relation to the personal information (background) section of the survey. A significant difference (p 0.05) was noted on five specific items; however, when a correction factor (Yates factor) was applied, there was no statistically significant differences between the two samples (AHPP Supplementary). Therefore, all background information was presented for the combined sample.

APPENDIX VII

PERCENTAGE OF RESPONDENTS AND MEAN SCORES FOR ADMINISTRATIVE AND SUPERVISORY TASKS

TASKS	Group 1		Group 3		Group 4		Group 5		Group 6	
	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$
1.1 Supervise departmental public relations and information service.	52	1.8	11	1.6	8	2.0	5	2.0	7	2.0
1.2 Establish and maintain safety standards.	54	2.0	49	1.3	42	1.8	38	1.1	35	1.2
1.3 Establish and maintain standards of hygiene.	60	2.1	46	1.7	37	1.3	32	1.0	42	1.7
1.4 Establish an inventory system.	49	3.4	11	3.8	8	2.5	5	3.0	7	1.0
1.5 Perform inventory of supplies and equipment.	51	2.5	35	2.8	31	2.9	32	2.5	35	3.0
1.6 Plan departmental work flow.	55	2.1	16	2.0	9	2.2	10	2.0	21	1.3
1.7 Plan space requirements.	52	3.6	11	3.5	7	3.6	0	0	7	4.0
1.8 Coordinate work schedules with other departments.	44	2.6	24	1.9	16	1.2	5	4.0	21	1.7
1.9 Draft departmental budget estimates.	46	3.9	2	3.0	5	4.0	0	0	7	2.0
1.10 Draft job descriptions.	41	4.0	8	4.0	3	4.0	0	0	14	4.0
1.11 Determine staff requirements.	52	2.9	22	2.9	2	2.5	5	3.0	7	1.0
1.12 Develop departmental evaluation procedures.	57	3.2	21	3.0	8	2.5	5	4.0	7	4.0

Key: Group 1 Administrator/Supervisor
Group 3 Therapist
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

$\bar{X}$ = Mean Score
Range of Scores = 1.0 to 5.0
1 = High Frequency
5 = Low Frequency

PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR ADMINISTRATIVE AND SUPERVISORY TASKS

TASKS	Group 1 %	Group 1 $\bar{X}$	Group 3 %	Group 3 $\bar{X}$	Group 4 %	Group 4 $\bar{X}$	Group 5 %	Group 5 $\bar{X}$	Group 6 %	Group 6 $\bar{X}$
1.13 Develop departmental hiring procedures.	44	3.8	8	3.6	3	3.5	5	4.0	7	3.0
1.14 Interview prospective employees and recommend action.	52	3.7	11	3.8	3	4.0	0	0	0	0
1.15 Develop departmental procedure manual.	63	3.8	27	3.8	8	3.4	5	4.0	28	4.0
1.16 Develop departmental policy manual.	49	3.5	13	4.0	6	2.8	0	0	7	4.0
1.17 Evaluate equipment performance.	70	2.1	60	1.7	34	1.7	16	1.0	35	1.6
1.18 Initiate purchase orders.	70	2.5	22	2.6	18	2.3	5	3.0	7	2.0
1.19 Check equipment specifications.	46	2.2	41	2.4	26	2.5	10	1.5	35	1.4
1.20 Organize staff meetings.	41	3.3	5	3.0	3	3.5	0	0	0	0
1.21 Prepare statistical reports.	68	2.0	22	2.3	13	2.0	5	3.0	35	1.5
1.22 Establish departmental charge system.	44	3.5	11	3.3	9	2.0	0	0	7	2.0
1.23 Attend relevant hospital management meetings.	73	3.1	22	2.9	8	4.0	0	0	7	4.0

Key: Group 1 Administrator/Supervisor
Group 3 Therapist
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

$\bar{X}$ = Mean Score
Range of Scores = 1.0 to 5.0
1 = High Frequency
5 = Low Frequency

PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR EDUCATION - TRAINING - RESEARCH TASKS

TASKS	Group 1 %	Group 1 X̄	Group 3 %	Group 3 X̄	Group 4 %	Group 4 X̄	Group 5 %	Group 5 X̄	Group 6 %	Group 6 X̄
2.1 Conduct or assist in research.	25	2.8	25	3.2	15	3.6	5	4.0	14	3.5
2.2 Teach inhalation therapy procedures.	91	3.5	74	3.4	53	3.0	16	3.0	28	2.6
a. Patients (e.g., postural drainage)	70	2.4	66	2.0	37	2.1	16	3.0	50	1.7
b. Department members	81	2.2	60	2.6	34	2.8	5	4.0	28	3.3
c. Clinical students	62	2.1	52	2.4	1	3.1	11	3.5	14	3.0
d. Nursing staff	73	3.0	63	2.6	35	3.0	11	2.0	28	3.3
e. Medical staff	57	3.1	47	2.7	15	3.2	0	0	21	3.7
2.3 Teach safety techniques.	78	2.3	54	2.2	32	1.9	11	2.0	42	2.3
2.4 Participate in relevant community health projects.	49	3.8	8	3.7	1	3.0	0	0	7	4.0
2.5 Participate in "health career" promotion.	47	3.2	19	2.6	3	4.0	0	0	7	4.0
2.6 Orient new employees to hospital and departmental procedures.	78	3.4	52	3.7	27	3.6	27	3.6	14	3.5
2.7 Develop education and/or training programs.	63	3.3	25	3.9	4	3.3	5	2.0	14	3.5
a. On-the-job training programs	62	2.8	21	3.4	10	3.2	0	0	14	3.5

Key: Group 1 Administrator/Supervisor
Group 3 Therapist
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

X̄ = Mean Score
Range of Scores = 1.0 to 5.0
1 = High Frequency
5 = Low Frequency

PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR EDUCATION - TRAINING - RESEARCH TASKS

(Continued)

TASKS	Group 1 %	Group 1 $\bar{X}$	Group 3 %	Group 3 $\bar{X}$	Group 4 %	Group 4 $\bar{X}$	Group 5 %	Group 5 $\bar{X}$	Group 6 %	Group 6 $\bar{X}$
b. In-service training programs	62	3.3	13	3.0	6	3.7	0	0	7	4.0
c. Inhalation therapy school programs	38	3.3	19	2.8	1	0	5	2.0	0	0
2.8 Design and implement home care programs.	33	3.4	10	3.8	6	3.5	5	4.0	0	0

Key: Group 1 Administrator/Supervisor
Group 3 Therapist
Group 4 Technician
Group 5 Aide/Orderly
Group 6 Others

$\bar{X}$ = Mean Score
Range of Scores = 1.0 to 5.0
1 = High Frequency
5 = Low Frequency

PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR DIAGNOSTIC TECHNIQUE TASKS

TASKS	Group 1 %	Group 1 $\bar{X}$	Group 3 %	Group 3 $\bar{X}$	Group 4 %	Group 4 $\bar{X}$	Group 5 %	Group 5 $\bar{X}$	Group 6 %	Group 6 $\bar{X}$
3.1 Operate ECG recorder.	15	3.3	19	3.3	10	2.7	5	3.0	21	2.7
3.2 Perform gas analysis.	35	2.0	21	2.3	27	2.0	10	3.0	14	1.5
a. Simple	25	1.8	18	1.7	18	2.4	11	4.0	7	0
b. Multiple	15	2.2	4	2.0	14	2.4	5	2.0	14	1.0
c. Blood gas tensions	49	2.0	15	3.0	19	2.2	5	1.0	21	1.0
3.3 Operate pressure transducers.	9	2.5	2	2.0	5	2.0	10	3.5	7	1.0
3.4 Administer and assist in exercise testing.	31	3.2	27	2.8	15	2.1	5	4.0	14	3.0
3.5 Measure blood pH.	38	2.2	22	3.0	21	2.6	5	1.0	35	1.0
3.6 Operate multi-channel recorder(s).	10	3.3	2	3.0	1	3.0	0	0	7	2.0
3.7 Operate telemetry system(s).	5	3.0	0	0	3	3.0	0	0	7	2.0
3.8 Assist with cardiac catheterization.	10	3.0	11	3.8	6	3.0	5	4.0	7	2.0
3.9 Perform calculations for pulmonary function tests.	41	2.5	16	3.3	13	2.5	10	2.5	28	2.7
3.10 Compare pulmonary function test results with norms.	52	2.5	15	2.0	20	2.5	5	1.0	28	2.5

Key: Group 1 Administrator/Supervisor
Group 3 Therapist
Group 4 Technician
Group 5 Aide/Orderly

$\bar{X}$ = Mean Score
Range of Scores = 1.0 to 5.0
1 = High Frequency
5 = Low Frequency

PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR DIAGNOSTIC TECHNIQUE TASKS

(Continued)

TASKS	Group 1 %	Group 1 X̄	Group 3 %	Group 3 X̄	Group 4 %	Group 4 X̄	Group 5 %	Group 5 X̄	Group 6 %	Group 6 X̄
3.11 Induce and collect sputum samples.	59	2.6	63	2.2	49	2.7	38	2.9	42	2.2
3.12 Collect tracheal-bronchial secretions.	43	2.3	65	1.7	27	2.9	16	2.0	35	2.6
3.13 Perform and assist with arterial punctures.	44	2.5	16	2.5	25	2.1	5	1.0	28	1.5
3.14 Measure vital signs.	55	1.9	41	1.9	32	1.8	22	2.3	21	1.0
3.15 Evaluate vital signs.	62	2.1	46	1.6	34	1.4	27	2.0	35	2.2
3.16 Recognize artifacts in EKG record.	33	2.3	27	2.0	7	2.6	0	0	21	1.7
3.17 Identify wave forms of EKG.	26	3.0	24	2.1	12	3.9	0	0	14	1.5
3.18 Perform auscultation.	47	2.2	30	1.9	16	1.7	16	2.0	21	1.3
3.20 Perform pulmonary function tests.	41	2.5	29	3.6	14	2.0	16	2.5	35	2.8
a. Functional residual capacity	25	2.0	19	3.6	5	2.0	5	1.0	7	3.0
1. Nitrogen wash out	10	2.5	8	3.0	0	0	5	1.0	0	0
2. Helium dilution	18	1.7	13	3.4	3	2.0	0	0	7	1.0
3. Body box (Plethysmograph)	0	0	2	4.0	0	0	0	0	0	0
b. Spirometry	28	2.1	35	2.8	28	2.4	10	2.5	14	3.5

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Group 6 Others

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PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR DIAGNOSTIC TECHNIQUE TASKS

(Continued)

TASKS	Group 1 %	Group 1 $\bar{X}$	Group 3 %	Group 3 $\bar{X}$	Group 4 %	Group 4 $\bar{X}$	Group 5 %	Group 5 $\bar{X}$	Group 6 %	Group 6 $\bar{X}$
1. (Forced) vital capacity	46	2.4	35	3.0	27	2.6	10	2.5	28	2.7
2. Slow vital capacity	39	2.1	24	2.7	15	2.8	10	2.5	28	2.8
3. Bedside spirometry	34	2.9	41	2.7	35	2.6	5	4.0	0	0
c. Maximum voluntary vertilation (MVC)	39	2.3	27	3.2	18	2.2	10	2.5	21	2.7
d. Expired air collection and analysis	10	2.5	13	3.2	6	2.3	5	2.0	7	2.0
e. Diffusion capacity	7	2.3	2	4.0	1	4.0	5	2.0	0	0
f. Compliance measurements	4	1.5	13	2.8	8	2.5	0	0	7	4.0
g. Airway resistance measurements	5	1.5	5	2.5	3	3.0	0	0	0	0
h. Measure alveolar p Co_2	5	1.5	8	2.0	12	2.7	5	1.0	7	1.0
i. Estimate arterial p Co_2 (via rebreathing technique)	10	3.0	2	3.0	7	3.0	0	0	7	1.0
j. Measure cardiac output	5	4.0	0	0	3	3.5	0	0	0	0
1. Fick principle	4	3.0	0	0	1	4.0	0	0	7	3.0
2. Indicator dilution technique	7	3.0	0	0	0	0	0	0	0	0
3. Plethysmography	2	4.0	0	0	0	0	0	0	0	0

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PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR DIAGNOSTIC TECHNIQUE TASKS

(Continued)

TASKS	Group 1		Group 3		Group 4		Group 5		Group 6	
	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$
k. Pneumotachometer	2	4.0	2	4.0	2	3.0	0	0	0	0
l. Radioactive gas techniques (ventilation/perfusion)	0	0	0	0	0	0	0	0	0	0

Key: Group 1 Administrator/Supervisor
Group 3 Therapist
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Group 5 Aide/Orderly
Group 6 Others

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5 = Low Frequency

PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR THERAPEUTIC TECHNIQUE TASKS

TASKS	Group 1 %	Group 1 $\bar{X}$	Group 3 %	Group 3 $\bar{X}$	Group 4 %	Group 4 $\bar{X}$	Group 5 %	Group 5 $\bar{X}$	Group 6 %	Group 6 $\bar{X}$
4.1 Operate defibrillator.	28	3.4	8	3.7	6	3.5	5	1.0	7	4.0
4.2 Operate respirators.	81	1.4	91	1.2	84	1.4	49	1.6	35	2.0
a. Treatment (IPPB)	70	1.5	93	1.0	86	1.2	44	1.3	49	1.1
b. Assistors	76	2.1	91	1.5	75	2.2	38	3.7	42	3.0
c. Controllers	76	2.2	91	1.9	67	2.2	32	3.6	35	2.8
4.3 Aerosol generators.	57	1.6	66	1.1	64	1.4	38	1.7	35	2.0
a. Vaporizers (steam)	52	1.9	43	1.9	54	1.4	44	1.5	42	1.7
b. Bubbler type	55	1.6	74	1.1	73	1.2	54	1.9	50	1.6
c. Jet type	52	1.8	74	1.2	68	1.6	54	2.0	50	1.7
4.4 Administer or assist with exercise conditioning.	22	2.9	21	2.1	4	2.7	16	3.7	7	2.0
4.5 Humidifiers.	70	1.5	93	1.0	85	1.2	66	1.5	50	1.3
a. Nebulizer type	68	1.5	93	1.2	87	1.2	66	1.2	57	1.6
b. Centrifuge type	49	1.6	38	2.4	21	1.8	27	2.0	42	1.7
c. Ultrasonic type	68	1.5	93	1.1	91	1.6	55	1.6	57	1.4

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PERCENTAGE OF RESPONDENTS AND MEAN SCORES FOR THERAPEUTIC TECHNIQUE TASKS (Continued)

TASKS	Group 1 %	Group 1 X̄	Group 3 %	Group 3 X̄	Group 4 %	Group 4 X̄	Group 5 %	Group 5 X̄	Group 6 %	Group 6 X̄
4.6 O_2 Administration.	65	1.5	90	1.1	85	1.1	61	1.3	42	1.2
a. Nasal devices	68	1.5	93	1.3	89	1.3	61	1.7	57	1.3
b. Masks	67	1.8	93	1.3	89	1.6	66	1.5	57	2.3
c. Tents	59	2.8	85	1.8	69	2.5	49	1.7	57	2.5
d. Incubators	39	3.0	58	2.5	32	2.9	22	2.3	14	3.5
4.7 Operate Co_2 rebreathers.	46	2.8	52	3.3	49	2.8	27	2.4	35	3.0
4.8 Perform closed chest cardiac massage (emergency care).	88	2.9	77	3.1	58	2.9	27	3.6	42	2.1
4.9 Perform artificial respiration.	83	2.7	88	2.8	78	2.7	38	3.4	57	2.8
4.10 Recognize expected reactions to treatment.	70	1.6	82	1.4	79	1.4	33	1.3	64	1.9
4.11 Recognize complications of/or adverse reactions to treatments.	78	1.7	79	1.7	82	1.8	38	2.6	42	1.7
4.12 Know the contraindications of treatments.	70	1.6	79	1.5	79	1.3	27	1.4	42	1.5
4.13 Assist with or perform hyperbaric procedures.	10	2.8	2	2.0	3	2.5	0	0	0	0

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PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR THERAPEUTIC TECHNIQUE TASKS

(Continued)

TASKS	Group 1 %	Group 1 $\bar{X}$	Group 3 %	Group 3 $\bar{X}$	Group 4 %	Group 4 $\bar{X}$	Group 5 %	Group 5 $\bar{X}$	Group 6 %	Group 6 $\bar{X}$
4.14 Use suctioning equipment.	73	2.1	74	1.4	75	1.9	10	2.5	57	2.1
4.15 Assist with postural drainage.	55	2.5	49	2.0	35	2.4	16	3.0	50	2.3
4.16 Perform chest physiotherapy.	36	2.2	32	1.9	25	2.3	5	4.0	21	2.0
4.17 Perform intubations.	30	3.4	11	3.8	19	3.4	0	0	7	2.0
4.18 Give tracheostomy care.	54	2.0	63	1.8	55	2.0	16	2.3	21	2.0
4.19 Use portable (tank) 0_2 in treatments.	56	2.1	77	2.5	76	2.2	38	2.6	50	2.1
4.20 Use piped 0_2 in treatments.	73	1.4	88	1.1	87	1.1	43	1.1	42	1.0
4.21 Use mixed gases in treatments.	57	2.7	66	2.7	50	2.6	11	4.0	21	3.3
4.22 Use pharmacological aids as directed.	64	1.7	71	1.1	70	1.3	38	1.6	28	1.0
a. Bronchodilators	67	1.5	88	1.1	87	1.2	44	1.5	57	1.3
b. Detergents	62	1.8	83	1.7	68	1.3	33	1.1	42	1.8
c. Mucolytics	70	1.8	79	1.4	82	1.3	33	1.1	57	1.5
d. Proteolytic enzymes	47	2.6	46	3.1	30	2.5	16	3.7	28	2.3
e. Antibiotics	57	2.6	61	3.3	46	2.7	22	3.5	28	3.3

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PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR THERAPEUTIC TECHNIQUE TASKS

(Continued)

TASKS	Group 1		Group 3		Group 4		Group 5		Group 6	
	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$
f. Steroids	31	2.8	24	3.4	25	2.7	11	3.5	7	3.0
g. Antifoam agents	67	2.4	69	2.2	56	2.3	27	3.4	42	3.0
4.23 Apply sterile techniques.	65	1.8	77	1.6	78	1.5	72	1.7	64	1.7

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Group 3 Therapist
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Group 5 Aide/Orderly
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PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR CLERICAL AND MISCELLANEOUS TASKS

TASKS	Group 1		Group 3		Group 4		Group 5		Group 6	
	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$	%	$\bar{X}$
5.1 Plan own work flow.	67	1.5	58	1.2	56	1.1	55	1.4	57	1.1
5.2 Maintain physical condition of facilities and equipment.	52	1.5	55	1.5	46	1.5	66	1.1	35	1.6
5.3 Schedule appointments with patients.	53	1.9	30	1.8	30	2.1	33	2.3	42	2.1
5.4 Answer telephone.	70	1.2	96	1.0	90	1.1	77	1.1	71	1.0
5.5 Transport patients.	28	3.0	52	2.3	65	2.4	38	3.0	35	3.2
5.6 Mount ECG records.	4	2.0	2	2.0	5	2.3	5	3.0	14	2.0
5.7 Use isolation techniques.	68	2.4	85	2.4	83	2.4	49	2.8	64	2.9
5.8 Service O_2 delivery system.	17	3.3	38	1.8	14	2.7	27	2.0	7	4.0
5.9 Maintain anesthetic gas supply.	33	2.5	36	3.2	13	2.5	16	3.3	7	2.0
5.10 Use hypothermic technique(s).	17	2.7	30	2.1	5	2.7	10	1.5	7	1.0
5.11 Alter respirator settings on basis of blood gas data.	73	2.1	71	2.0	44	2.0	5	4.0	7	2.0
5.12 Alter respirator settings on basis of observations.	65	1.6	79	1.4	56	1.7	27	1.4	42	1.1
5.13 Improvise or modify equipment for special requirements.	78	3.1	58	2.6	41	2.9	16	2.7	35	2.8

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PERCENTAGE OF RESPONDENTS AND MEAN SCORES
FOR CLERICAL AND MISCELLANEOUS TASKS

(Continued)

TASKS	Group 1 %	Group 1 X̄	Group 3 %	Group 3 X̄	Group 4 %	Group 4 X̄	Group 5 %	Group 5 X̄	Group 6 %	Group 6 X̄
5.14 Stock and dispense cylinder gas.	47	2.2	57	2.0	60	2.1	49	2.1	28	1.8
5.15 Stock departmental drugs.	46	2.7	21	2.7	23	2.4	38	2.9	21	3.0
5.16 Mix and measure drug doses which you use.	62	1.6	77	1.1	69	1.2	32	1.0	50	1.1
5.17 Report treatment given on patients' chart.	65	1.3	60	1.1	61	1.2	42	1.0	64	1.0
5.18 Read patients' chart.	86	1.5	93	1.1	88	1.1	49	1.3	64	1.2

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APPENDIX VIII

TASK LIST ADDITIONS

1. Rounds (3)*
2. Deliver arrest cart and assist (1)
3. Transport and replace gas cylinders (5)
4. Sterilize water (1)
5. Assist in bronchoscopy (1)
6. Operate extracorporeal equipment (2)
7. Billing and departmental payroll (1)

* Indicates number of respondents